

REPORT OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
For The Biennium 1932-1934

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REPORT OF THE
North Carolina
Department of Agriculture
For the Biennium 1932-1934



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CHARLOTTE, N. C.

LETTER OF TRANSMITTAL

*To His Excellency, J. C. B. EHRINGHAUS,
Governor of North Carolina:*

SIR:

In compliance with Chapter 248, Public Laws of 1929, I submit the following report of the work of the Department of Agriculture for the biennium 1932-1934.

Respectfully,

A handwritten signature in dark ink, appearing to read "Wm. A. Graham". The signature is fluid and cursive, with the first name "Wm." clearly legible.

Commissioner of Agriculture.

RALEIGH, N. C.,
NOVEMBER 1, 1934.



J. C. B. EHRLINGHAUS, *Governor of North Carolina*



WM. A. GRAHAM, *Commissioner of Agriculture*

**REPORT OF THE
NORTH CAROLINA
DEPARTMENT OF AGRICULTURE
FOR THE BIENNIUM 1932-1934**

PERSONNEL OF THE STATE DEPARTMENT OF AGRICULTURE

STATE BOARD OF AGRICULTURE

WM. A. GRAHAM, *Commissioner, Chairman*, Raleigh

J. G. STATON	Williamston
D. H. BRIDGERS	Warsaw
C. S. YOUNG	Shelby
D. R. NOLAND	Crabtree
T. G. CURRIN	Oxford

ADMINISTRATION

W. A. GRAHAM	<i>Commissioner</i>
K. W. BARNES	<i>Purchasing Agent</i>
W. H. RICHARDSON	<i>Editor of Publications</i>
M. H. HILL	<i>Principal Accounting Clerk</i>
MARY KNIGHT	<i>Stenographer-Secretary</i>

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S. B. CLEMENT	<i>Inspector</i>
T. J. BETTS	<i>Inspector</i>
CHAS. H. GODWIN	<i>Inspector</i>
W. C. HAMMOND	<i>Inspector</i>
J. A. BRADFORD	<i>Inspector</i>

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T. T. BROWN	<i>Associate Specialist</i>
C. W. SHEFFIELD	<i>Associate Specialist</i>
A. R. POWLEDGE	<i>Senior Accounting Clerk</i>
MABLE HAYNES	<i>Senior Stenographer Clerk</i>

SAVINGS AND LOAN

H. M. BERRY	<i>Agricultural Credit Specialist</i>
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ANALYTICAL

W. G. HAYWOOD	<i>Senior Chemist</i>
L. M. NIXON	<i>Associate Chemist</i>
Z. B. BRADFORD	<i>Associate Chemist</i>
E. T. HORD	<i>Junior Chemist</i>
W. B. HENDRIX	<i>Junior Chemist</i>
H. F. PICKERING	<i>Junior Chemist</i>
J. S. PITTARD	<i>Junior Chemist</i>
J. C. MATTHEWS, JR.	<i>Junior Chemist</i>
MARY S. BIRDSONG	<i>Secretary</i>
MRS. HEBER B. HATCH	<i>Senior Stenographer Clerk</i>

ENTOMOLOGY

R. W. LEIBY	Senior Entomologist
J. A. HARRIS	Associate Entomologist
C. S. BRIMLEY	Junior Entomologist
D. L. WRAY, JR.	Junior Entomologist
MRS. PAULINE NEWSOME	Senior Stenographer Clerk

BOTANY

J. L. BURGESS	Senior Botanist
SUSIE D. ALLEN	Supervising Seed Analyst
J. W. WOODSIDE	Seed Analyst
ELIZABETH MADDEN	Seed Analyst
KATE BALLARD	Senior Stenographer Clerk

PURE FOOD

W. M. ALLEN	Senior Chemist
W. A. QUEEN	Associate Chemist
L. B. RHODES	Associate Chemist

CROP STATISTICS

FRANK PARKER	Statistician (Federal)
WM. H. RHODES	Associate Statistician
W. B. GOODING	Junior Statistician
MRS. E. R. SIMPSON	Senior Statistical Clerk
REBECCA WILLIAMS	Senior Statistical Clerk
MRS. CATHERINE W. HAIG	Senior Statistical Clerk
MRS. POLK DENMARK	Senior Statistical Clerk
MRS. SARAH FENNER	Junior Statistical Clerk
HERBERT BARNES	Senior Mailing Clerk

MUSEUM

H. H. BRIMLEY	Curator
H. T. DAVIS	Junior Curator

VETERINARY

WM. MOORE	Senior Veterinarian
L. J. FAULHABER	Associate Veterinarian
B. H. STATON	Junior Veterinarian
H. S. WILFONG	Junior Bacteriologist
MRS. L. S. HARRIS	Senior Stenographer

WAREHOUSE

A. B. FAIRLEY	Superintendent
C. R. REYNOLDS	Senior Cotton Classifier
J. B. HAYWOOD	Junior Cotton Classifier
MRS. NELLA MASON	Senior Stenographer
ELIZABETH MOORE	Senior Stenographer

BIENNIAL REPORT

TEST FARMS

F. E. MILLER	<i>Director and Horticulturist</i>
R. E. CURRIN, JR.	<i>Superintendent Edgecombe Test Farm, Rocky Mount</i>
J. W. HENDRICKS	<i>Superintendent Iredell Test Farm, Statesville</i>
S. C. CLAPP	<i>Superintendent Buncombe Test Farm, Swannanoa</i>
CHAS. DEARING	<i>Superintendent Pender Test Farm, Willard</i>
E. G. MOSS	<i>Superintendent Granville Test Farm, Oxford</i>
J. L. REA, JR.	<i>Superintendent Washington Test Farm, Wenona</i>
LOUISE WRIGHT	<i>Junior Stenographer Clerk</i>
ELIZABETH FLOYD	<i>Junior Stenographer Clerk</i>
B. D. WILLIAMS	<i>Junior Stenographer Clerk</i>
T. H. CAMERON	<i>Experiment Station Dairyman</i>
D. P. SOUTHERLAND	<i>Experiment Station Foreman</i>
H. B. COULTER	<i>Experiment Station Dairyman</i>
C. O. BOLLINGER	<i>Experiment Station Poultryman</i>
A. B. DEAN	<i>Experiment Station Foreman</i>
W. M. WHISENHUNT	<i>Experiment Station Foreman</i>
H. D. SMITH	<i>Experiment Station Poultryman</i>
W. C. ALLSBROOK	<i>Experiment Station Herdsman</i>
A. P. LEFEVERS	<i>Experiment Station Feeder</i>
BYRAN HARRIS	<i>Livestock Assistant</i>

DAIRY

A. H. KERR	<i>Dairy Specialist</i>
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WEIGHTS AND MEASURES

C. D. BAUCOM	<i>Superintendent</i>
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STATE FAIR

R. E. SHOLES	<i>Caretaker</i>
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BIENNIAL REPORT OF THE NORTH CAROLINA DEPT. OF AGRICULTURE

WILLIAM A. GRAHAM, *Commissioner*

Notwithstanding North Carolina is found in the midst of the smaller states in respect to area and population, she stands among the first in agriculture and industry. She leads all the states in the production and manufacture of tobacco. While a number of other southern states lead her in the production of cotton, she surpasses them all in its manufacture, boasting at this time of 371 textile mills within her borders.

North Carolina stands first in the production of tobacco and sweet potatoes; second in the production of soybeans and peanuts; third in the production of early Irish potatoes and Japan clover; and—what is most remarkable of all, regained her position of fourth in the total value of her farm products among all the states of the Union during the first year of recovery.

In the total value of her farm products, North Carolina is \$111,135,000 ahead of Virginia; \$63,732,000 ahead of Georgia; \$70,626,000 ahead of Missouri; \$69,840,000 ahead of Oklahoma; \$73,445,000 ahead of New York; \$77,251,000 ahead of Pennsylvania; and so on throughout the other forty-four states—standing fourth, as noted above, among all the states of the Union in the total value of her farm products in the year 1933.

The above values relate to field crops only. North Carolina's livestock and dairy production is very important. Among the states of the South, she stands seventh in the number of pounds of milk produced at this time, and bids fair to stand first in the very near future because we are today fostering as never before the dairy industry. With our good roads system, milk can be produced at points far away from the main centers of population and brought quickly into town for consumption. As our industrial population grows, the demand for milk and dairy products will likewise increase; and our farmers are going to take advantage of our milk markets and supply them.

We have in North Carolina a rare combination of soil, climate, transportation facilities, industrial development, and home market demand. Nowhere is the farmer more happily situated than in this State today, where he can take his farm products a hundred miles in almost any direction over a hard surface road to a waiting market. That is why North Carolina, though one of the smaller states in the Union in population and land area, stands fourth in the total value of her field crop production and is forging ahead so rapidly in supplying markets created by our ever-increasing industrial development.

This industrial development is made possible by our population of pure Anglo-Saxon races, the healthful living conditions found everywhere, and the unlimited hydroelectric power developed—and in the process of developing—with which to supply cheap operating energy for our superb manufacturing enterprises.

ACTIVITIES OF THE DEPARTMENT

The North Carolina Department of Agriculture is a constitutional department, provided for in the Constitution of 1876. It has been, from the first, manned by an efficient personnel, drawn from a patriotic citizenship of North Carolina. It has always placed the interests of the farmers above all other interests in the State. Out of this Department grew the agricultural colleges of the State. It was among the first institutions to establish experimental stations to look after the farmer's interests and to attempt to solve his everyday problems.

As time went on, it became necessary to bring about a division in the activities of the Department and separate those considered educational from those which were regulatory and of a research nature. Today the Department does no strictly teaching work, but does maintain research and experimental work in the various agricultural sections of the State for the purpose of discovering for the farmers new methods of fertilization, and the solution of problems that are strictly local in their nature and must be solved.

A study of the early agriculture of North Carolina revealed the fact that the State was divided by nature into four major agricultural sections; namely, coastal plain, tidewater, Piedmont and mountain. It was found that different crops were adapted to different sections and soil types of the State. We have one section especially adapted to peaches and small fruit, one to pota-

toes and peanuts; another where tobacco does better; and still other sections in which cotton is the leading farm crop.

The eastern part of North Carolina became the leading hog producing section, and here diseases peculiar to these animals had to be met and conquered. The Department encouraged dairying and beef production by freeing the entire State from bovine tuberculosis and the Texas fever tick.

Various diseases affecting poultry must also be combatted as this industry has gone forward very rapidly in recent years and is daily increasing.

WORK OF THE DIVISIONS OF THE DEPARTMENT

As our population increases, the demand and need for the work of the Department will continue to grow. Often the food supply of the State and Nation is threatened by drought, plant and animal diseases, insect pests, bad seeds, and poor fertilizers.

The Division of Entomology keeps the nurseries of the State up to standard and free from diseases, examines the orchards, and advises the owners as to the best methods of protecting them against insect ravages and destruction by rusts, etc.

The Botany Division aids the farmers and seed dealers in getting the best available seeds and thus prevents dead seeds being sold to them.

Through the Veterinary Division the Department protects the livestock industry of the State by stamping out animal diseases and carrying out the quarantine laws, keeping diseased animals out of the State. During the present year, when the entire country was under the stress of handling quickly thousands of heads of famished western cattle, we were able to let these cattle come into the State under the requirements of the quarantine law, thus protecting our farmers from the danger of having diseases transmitted to their cattle.

Through the Dairy Division the Department is rapidly developing interest in the dairy business of the State along control lines, emphasizing the need for the consumption of more and more dairy products.

The Food Division gives its time to the supervising and policing of the various foods offered for sale to our people. As the population increases and as our knowledge of foods becomes more and more extended, the work of the Food Division will be found increasingly important to the health and longevity of our people.

The Savings and Loan Division was created for the purpose of enabling our farmers to borrow on coöperative terms and thereby finance their crops. This work is conducted along mutual lines, and its purpose is not only to provide proper financing in seasons of stress, but also to encourage saving.

Through the Weights and Measures work of the Department, the public is protected against short measures in all commodities that move in our markets. The Division operates on an appropriation which has never been sufficient to warrant its proper expansion, although the funds available have been utilized to the best advantage. I hope the next Legislature will provide ample funds for the proper execution of the law.

The Division of Statistics keeps records of all crop production activities of the State. This information is sent out from this division from time to time. The Division of Statistics is the one division from which accurate information may be had concerning the status of North Carolina among her sister states, in all matters of crop production.

The Analytical Division tests samples of fertilizers, feeds and insecticides sold in the State, with a view to determining whether they measure up to the required standards. Where it is found that manufacturers are not living up to the law, penalties are imposed. Through this Division, the Commissioner executes the fertilizer laws, the feed laws and other regulatory statutes which have to do with the chemical contents of products bought and sold on North Carolina markets.

The Department maintains an active and efficient Marketing Division through which it aids the farmer in his efforts to offer his products for sale under the most modern marketing conditions. This division inspects truck crops, fruit crops, and other farm crops for interstate commerce, and in various other ways helps the farmer to find a market for his produce. This Division in coöperation with the U. S. Department of Agriculture maintains a tobacco grading service to aid the farmer in preparing his tobacco for the market. It has also rendered great service to the farmers in organizing mutual exchanges.

The Warehouse Division maintains warehouses for the cotton farmers of the State, in which their cotton can be stored for periods of time awaiting market conditions that will justify sale. This service has been of great value to the farmers of the State.

Through the Division of Publications the Department informs the people, from time to time, as to various things it is doing, and sends out bulletins and reports from the different divisions to farmers who request them. Through one semi-monthly paper, *Agricultural Review*, assistance is given farmers in buying, selling and exchanging their goods.

The State Museum is gradually growing in the number of its exhibits and is the show-place for both parents and children of North Carolina who would like to see the past and present of the State in the way of plants, animals and minerals.

The Test Farm Division conducts six test farms located in different parts of the State which are used as field laboratories for the investigation of the agricultural problems peculiar to the section in which each is located.

Every year an annual farmers' picnic is held at each of these farms and thousands of people attend to observe the results of the experiments and get whatever information there may be that will be useful to them in their own farming operations.

These farms, small to begin with, have grown into large institutions under the direction of the Department. Every one is invited to visit the farms during the year and observe the experiments in process of development, as they form the basis for practically all improvements in farm methods and serve as the main source of agricultural information in the different sections of the state.

This work is done in coöperation with the U. S. Department of Agriculture, The North Carolina State College, and Central Experiment Station.

When fertilizers, feeds, seeds, and cottonseed meal fail to come up to guarantees, they are seized and taken off the market. From June 30, 1932, to June 30, 1934, there were 13 seizures of fertilizers, 102 seizures of feed, 67 seizures of seeds and 26 seizures of cottonseed meal. Penalties were enforced as the law prescribes.

A modern system of accounting has recently been installed by which an accurate record of all financial transactions will be maintained.

The Department of Agriculture operates entirely on receipts from an inspection tax, and the Legislature makes no direct appropriation for its maintenance.

In 1931, the Legislature placed the State Fair in the Department of Agriculture as one of its divisions. It was provided

that the Board of Agriculture should operate said Fair with the same powers as those vested in the old State Fair Board. For the following two years the Fair was run without an operating deficit. The 1933 Legislature made no appropriation for its continuance, but stipulated it would have to operate on its own receipts. There was a provision in the new law, however, giving the Board authority to lease the Fair, and the Board considered it more feasible to lease than to operate.

In 1933, the lease was given to George Hamid of New York and Hon. W. H. Joyner of Garysburg, N. C., who secured the assistance of Mr. Norman Y. Chambliss as Secretary-Manager. This year the Fair was again leased, this time to Mr. Hamid and Mr. Chambliss, the Board retaining supervision.

The Board is composed of Hon. J. G. Staton, Hon. D. H. Bridgers, Hon. C. S. Young, Hon. D. Reeves Noland and Hon. T. G. Currin. The terms of Messrs. Noland and Currin will expire with this sitting of the General Assembly.

The Department of Agriculture sustained a loss in the death of one of the members of the Board, Hon. W. H. Joyner. While his services were of short duration, he endeared himself to the Commissioner and all his associates. Mr. Currin was appointed to fill the unexpired term of Mr. Joyner.

I wish to acknowledge my appreciation for the loyal and efficient manner in which the chiefs of the various divisions and their assistants have discharged their duties. While their compensation has been materially reduced they have accepted their fate and continued to render splendid service. I sincerely hope proper adjustment in their salaries will be made.

The Department of Agriculture is composed of the following divisions:

Administrative	Crop Statistics
Inspection	Museum
Publications	Veterinary
Markets	Test Farms
Savings and Loan	Warehouse
Analytical	Dairy
Entomology	State Fair
Botany	Weights and Measures
Pure Food	

I hereby append reports covering the work of each division.

DIVISION OF PUBLICATIONS

WM. H. RICHARDSON

TO THE COMMISSIONER OF AGRICULTURE:

The scope of work done by the Division of Publications, carried on under the direct supervision of the Commissioner, has continued to expand. While this has been true, there has been no call for any material increase in operating expenses, this Division sharing in the curtailments now in force, along with the others comprising the Department.

During the past biennium, the Agricultural Editor has continued to prepare and issue, twice a month, the publication known as *Agricultural Review*, which now goes to nearly 9,000 farm families scattered throughout North Carolina. This publication carries many articles and items of general interest to the farmers; news of the Department and copies of reports which are required to be published. For example, during the tobacco season, the monthly reports of sales, required by law to be published, are given in *The Review*; various rules and regulations which, if they were printed in separate pamphlet form, would incur added expense, are also printed in this paper, thereby saving printing costs. Crop reports are presented during the growing season.

Perhaps the most outstanding service to the farmers through this medium, however, is the publication, free of charge, of various notices of articles for sale and exchange. Also, the names of many who want items falling under the agricultural classification, are published, thus affording a market for numerous commodities which, otherwise, might remain undisposed of.

During the past biennium, *The Review* has served thousands of individual farmers in this manner, and it is sincerely hoped that provision will be made for a further expansion of this particular service during the next two-year period. There have been received many suggestions—or requests—that this paper be enlarged, so as to serve an even greater number of farmers, many of whom have come to depend on it to a large degree for additional revenue, derived from the sale and exchange of articles they are unable to advertise at regular commercial rates. It may be stated in this connection that this is the only service of its kind performed by any agency—and it is of direct benefit

to the farmers. There have been received hundreds of letters and other communications telling of the advantages of this service, which extends to all parts of the State and which undoubtedly causes the circulation of much money which, otherwise, would never reach the farmers.

The service performed through the medium of this publication does not in any way conflict with or encroach upon the field of regular newspapers or farm papers, as the purpose is to serve individual farmers or persons wishing to buy from or trade with such farmers. No commercial advertisements are taken. None appear from business firms, which are advised to use the columns of commercial papers and leave *The Review* to the farmers.

An instance of where this service brought money into the state was furnished in a letter from a man in Georgia, who wrote that, as the result of a single want ad, he purchased Angus cattle from North Carolina farmers to the amount of \$3,000. This is just one example.

During the past biennium, the Agricultural Editor has personally handled thousands of requests from farmers and others desiring information which the Department was able to furnish. In instances where information is not available here, such requests are passed on to the agency in a position to supply it.

In order to secure information desired, it is often necessary to spend much time, doing a certain amount of research and other work.

The Division of Publications has received the hearty coöperation of the individual newspapers and the two leading news agencies, namely, the Associated Press and the United Press. All of these have shown a disposition to coöperate with the Department fully in the presentation of helpful items to the farmers and the public in general.

Into the office of the Agricultural Editor come many of the leading dailies and weeklies of the State, all of which were secured by him without a cent of cost to the Department but on an exchange basis. These newspapers enable the Division of Publications to keep track of the news items it releases and, when necessary, to clip these for the permanent files of the Department.

In addition to the above duties, the Agricultural Editor has, from time to time, arranged for news broadcasts over Station WPTF at Raleigh and WBT at Charlotte, each of which has

shown a willingness to coöperate in every way. None of these programs has incurred any cost to the Department.

When necessary, the Division of Publications has coöperated with other State agencies in presenting facts about North Carolina, and from such agencies it has also received full coöperation.

As stated at the outset, the work in this particular Division is carried on directly under the supervision of the Commissioner, and this office serves as a clearing house for all the other Divisions in the matter of getting out information.

The Editor of Publications has coöperated with the Test Farm Division in the matter of handling information concerning the various Test Farm field days, often going in person and writing these up for the leading papers of the State, as well as for the publications issued by this Department.

Until the State Fair was leased, the Agricultural Editor handled the publicity incident to it. This work was kept in scrap books, which were turned over to the Commissioner.

I wish to thank you for your splendid coöperation and support and pledge the services of this Division for the further promotion of the agricultural interests of the State.

DIVISION OF MARKETS

R. B. ETHERIDGE

In my report ending June 30, 1932, I reviewed briefly the disastrous period through which we were then passing and stated that the growers were receiving in most instances not enough for their products to pay the cost of production. Since that date there has been a gradual improvement as far as the farmers of North Carolina are concerned and there is a much better sentiment prevailing. The vegetable growers, principally on account of overproduction, are experiencing prices of an extremely low level, and it is hoped that something beneficial can be worked out in the immediate future whereby their financial status will be improved.

ORGANIZATIONS

There has been a continued interest on the part of the growers in this project of work during the past two years. Those growers, who are familiar with the wide margin between the cash prices paid for feeds, fertilizers, farm supplies, etc., when bought coöperatively, and the time price when bought in small units, frankly state that the amount saved is amazing and in many instances represents their net profits.

Mutual exchanges and coöperative associations incorporated during this period are as follows:

Coöperative Associations:

Mooreville Coöperative Creamery	Mooreville
Blue Ridge Milk Producers Coöperative Association.....	Asheville
Yadkin Valley Coöperative Milk Producers Ass'n.....	Yadkinville
Winston-Salem Coöperative Milk Producers Ass'n.....	Winston-Salem
Mountain Valley Coöperative	Brasstown
Farmers Coöperative Exchange	Raleigh
Farmers Coöperative of Durham Milkshed.....	Durham

Mutual Exchanges:

Beaufort County Mutual Exchange.....	Washington
Hickory Farmers Mutual Exchange.....	Hickory
Independent Vegetable Growers Association.....	St. Helena
Hoke County Mutual Exchange	Raeford
Moore County Mutual Exchange.....	Carthage
Harnett County Mutual Exchange.....	Lillington
Fairmont Farmers Mutual Exchange.....	Fairmont
Teachey Farmers Mutual Exchange.....	Teacheys
Tri-County Lespedeza Sericea Mutual.....	Red Springs

Mutual Exchanges (Continued):

Davie Mutual Exchange	Mocksville
Montgomery Mutual Exchange	Troy
Scotland Mutual Exchange	Laurinburg
Robeson Farmers Mutual Exchange.....	Lumberton
Hiddenite Mutual Exchange	Hiddenite
Haywood Mutual Stock Yards.....	Clyde
Carolina Mountain Mutual Association, Inc.....	Banner Elk
High Point Farmers Mutual Exchange.....	High Point

We are of the opinion that time and effort of the personnel of the Division can probably be spent to a better advantage in developing present organizations rather than in forming new ones, at least for a while. In this connection I wish to advise that special assistance has been given to the organizations in the following counties: Harnett (Dunn and Lillington), Johnston (Benson), Beaufort, Forsyth, Yadkin, Wayne, Warren, Clay (Brasstown), Halifax (Aurelian Springs), Wake (Fuquay Springs and Cary), Lee, Iredell and Durham.

We have assumed heretofore that all of the mutual associations and coöperative associations were eligible for exemption by the Bureau of Internal Revenue. However, the Bureau of Internal Revenue has advised the exchanges and associations that they must be passed upon by the Bureau before exemption is granted, and I wish to state that we have been working very closely with these organizations in preparing their reports in order that exemptions might be granted. In addition to working with them along this line, we made an effort to study their business and have made suggestions relative to more efficient management and have assisted them in keeping proper records.

Organizations and exchanges that we have helped to make reports to the Bureau of Internal Revenue are as follows:

Edgecombe Mutual Livestock Association.....	Tarboro
Fuquay Springs Mutual Poultry Association.....	Fuquay Springs
Orange Mutual Exchange	Hillsboro
Alamance Mutual Exchange	Graham
Chatham Mutual Milk Exchange.....	Pittsboro
Wake County Mutual Exchange	Raleigh
Carolina Poultry Mutual Exchange.....	Raleigh

Farmers' Coöperative Exchange, Inc.

One member of this Division spent a goodly portion of his time and effort in helping organize and develop the program of the Farmers' Coöperative Exchange, Inc. Almost the whole of every week for a six-months period was devoted to the perfecting of this state-wide farmers' coöperative marketing and purchasing corporation. Days and weeks were spent on its corporate papers, by-laws, charter, contracts and other forms and documents. Endless time was spent in conferences ironing out differences between factions of various groups. The organization is the elimination of destructive competition between coöperatives and provides a unified program which all agricultural agencies can support.

The Farmers' Coöperative Exchange (the F C X) is a state-wide purchasing and marketing organization owned, controlled and operated for and by the farmers of North Carolina. It was brought into being because of a definite need, which was recognized by leading farmers, farm organizations and agricultural leaders of the State. It did not spring up over night but is the result of ten years of constructive and tireless effort on the part of those sincerely interested in seeing the farmers own and control their own business and organization.

The purposes of the F C X are to purchase for farmers in wholesale quantities feeds, seeds, fertilizers and other farm supplies and equipment; to provide a regular systematic market for their products; and otherwise to represent and serve the rural population of North Carolina as a whole whenever feasible and practical. It is supplying its members raw materials used on the farm to produce crops and livestock. When the crops and livestock are ready for market, the F C X sells those commodities for the producer at the best possible price at the least possible cost. The open formula feeds and fertilizers are approved by the College Feed and Fertilizer Conference Board, which insures proper and balanced rations and the source of ingredients. The Seed Program of the F C X conforms to and supplements the program and policies of the North Carolina Pure Seed Association.

As to quality the F C X endeavors to supply its patrons with high grade open formula feeds and fertilizers and certified seeds

of known origin. The other material it handles, such as tobacco twine, binder twine, paints, spray materials and other supplies, are of the highest quality commensurate with price.

The F C X has three means of contact in serving its farmers in its retail program. *First*: Community and county mutual co-operative organizations. There are about eighty such organizations within this State, fifty to sixty of which are active in some capacity and approximately thirty of these are very active. The F C X, working through these organizations, provides the farmers in those areas the advantage of the full program of the F C X. *Second*: Whenever there are no local organizations and the farmers desire the service of the F C X, it will establish a branch. These branches are known as "..... F C X Service," carrying the name of the local community. Such service points are under the direction of the local advisory board and the patrons take membership in the F C X. *Third*: In order to serve the farmer in areas where the volume of business does not justify the operation of a local association or Service Branch, it will be necessary that the F C X reach the farmers through private dealers. Such arrangements are made with the approval of the farmers in the vicinity and the service is conducted under the direction of a local advisory committee.

For its manufacturing facilities the F C X is utilizing the organization and equipment of the Southern States Coöperative, which is a farmer-owned and operated organization. It has two feed mills with a capacity of 44 cars of feed per day. Supplies from this source are shipped to the eastern half of North Carolina. For Piedmont and western North Carolina, the F C X has contracted for milling and mixing facilities of one of the largest mills of its kind in North Carolina.

Probably there has never been a farmers' organization with such wholehearted support and coöperation as the F C X enjoys. Three leading and outstanding farmers' organizations operating in North Carolina consolidated with the F C X for the sake of harmony, so that the overhead cost may be kept at a minimum and in order that there be a unified program through one statewide farmers' wholesale buying and selling organization.

FRUITS AND VEGETABLES

Inspection Service

<i>Commodity</i>	<i>Approximate No. of Packages</i>
White Potatoes	2,387,090
Peaches	712,700
Strawberries	649,799
Beans	401,409
Peas	186,677
Cucumbers	69,652
Sweet Potatoes	39,400
Corn	36,675
Tomatoes	35,250
Cantaloupes	15,316
Apples	13,625
Dewberries	5,545
Huckleberries	2,598
Peppers	133
Watermelons	279 cars

The above represent inspections and certification as to grade and required a temporary personnel of 116 licensed inspectors during the heavy movement of potatoes in June, 1934. This work is being expanded from year to year and the volume of work done covered by this biennial report represents a material increase over that of any previous period. We had temporary offices at Elizabeth City, Mount Olive, Bayboro, Aurora, Fayetteville, Beaufort, Bethel, Pantego, Washington, Fairmont, New Bern, Wallace, Chadbourn, Tabor, Burgaw, Warsaw, Columbia, Creswell, Hasty, Laurinburg, Smithfield, Teachey, Faison, Vass, Roper, Jamesville, Rockingham, Plymouth, Southern Pines, Pinehurst, Aberdeen, West End, Jackson Springs, Sanford, Ellerbe, Marston, Morven, Candor and Hamlet. From these offices the service was made available to all growers and shippers at all shipping points.

In connection with this work, permit me to advise that we rendered a real service to the peach growers during the 1932 season. During May and June of that year most everybody seemed to think that the price would be unusually high during the shipping season due to an exceedingly light crop in Georgia. Contracts were made with the growers from \$1.75 to \$2.13 per package. During the early part of our shipping season the prices ranged from \$1.75 to \$2.50 but when the movement got a little heavy, there was a sharp decline in prices and at the time we were actually shipping the major part of our crop, f.o.b. prices

ranged around 75 cents. Those who made contracts with the growers on the basis of \$1.75 to \$2.50 were particularly eager to find causes for the rejection of their contract and the inspectional work played a very important part in acting as a neutral agency as to certifying as to grade the fruit which the growers packed. By having this service available this season the growers saved at least \$100,000 to \$150,000.

In connection with the fruit and vegetable industry, permit me to advise that members of the Division confer with growers and shippers from time to time relative to standardization and marketing.

Terminal Market Inspections

White potatoes	19 cars
Tomatoes	8 "
Apples	5 "
Onions	2 "
Oranges	1 "
Grapes	2 "
Snap beans	2 "
Watermelons	1 "
Miscellaneous vegetables	1 "
<hr/>	
Total	41 cars

These inspections report condition of the commodity and very often save the receiver a large sum of money. The commodities are bought on the basis of good sound condition at arrival and when it is shown that they arrive otherwise, the receivers are able to secure an adjustment.

Market News Service

In coöperation with the Bureau of Agricultural Economics, we issued daily bulletins on white potatoes from Washington, on strawberries from Chadbourn, and on peaches from Candor during the marketing season. These bulletins give the growers and shippers pertinent information such as f.o.b. prices at the larger shipping points, number of cars shipped each day and the number of cars each of the terminal markets receives, along with the price each market is paying. This information helps in better distribution and marketing.

Radio Broadcasting

In coöperation with the Bureau of Agricultural Economics there was broadcast each day over radio station WPTF, Raleigh, N. C., market information covering our major fruits and vegetables during the 1932-33 marketing period.

Stabilization of Irish Potato Industry

This is a coöperative piece of work carried on by the State Department of Agriculture in coöperation with the North Carolina Agricultural Extension Service, the Extension Services of other States who produce early potatoes, and the U. S. Department of Agriculture. Each autumn a series of meetings is held at Mt. Olive, Calypso, Beaufort, New Bern, Bayboro, Pantego, Aurora, Bethel, Columbia, Elizabeth City and Currituck, at which time factors relative to prices which the growers might receive the coming season are fully discussed. The object of this project of work is to familiarize the growers with prospective prices which they may receive for their potatoes at the time they are harvested.

The work done by Mr. A. E. Mercker has been successful. He works very closely with the growers and shippers during the marketing period and strives at all times to keep a uniform price at all shipping points. Through his influence the market is well stabilized and advances in the market well taken care of when conditions justify it.

FARM CROPS

Tobacco

Grading work on this commodity was conducted on the markets of Farmville, Smithfield, Oxford and Henderson on a voluntary basis during the 1932-1933 season, and the growers paid a fee for the service. Total number of pounds graded amounted to 1,758,100 pounds.

During the 1933-1934 season the Agricultural Adjustment Administration furnished funds whereby grading of this commodity was given gratis to the growers on the markets of Washington, Farmville, Henderson and Oxford. Total amount of tobacco graded was 47,692,916 pounds.

Tobacco Market News Service

In coöperation with the Bureau of Agricultural Economics we issued daily bulletins giving the prices paid to growers on

the markets where we had the grading work. These reports, in addition to the daily prices paid, also contained weekly and seasonal averages along with the prices paid for the same grade of the previous season.

Tobacco Radio Broadcasting

There is broadcast each afternoon over radio station WPTF, Raleigh, N. C., during the marketing season, information regarding the offerings of tobacco at points where the grading work is conducted, along with the average price paid to growers by grades and other information of interest to tobacco growers.

Soybeans

Inspectional work on this commodity was continued at Washington and Elizabeth City and we certified as to grade 48,939 bushels.

Miscellaneous

Assistance was given in the standardization and marketing of any and all farm crops.

POULTRY AND EGGS

Marketing Eggs

Work was conducted in nine counties in developing the quality egg marketing program for the State. This program is outlined in a publication of this Division entitled "Marketing Quality Eggs in North Carolina," January 1933. The organizations at New Bern, Goldsboro, Washington, Winston-Salem, Durham, Hickory, Statesville and Asheville, and the community group at Polkton did some work towards the establishment of the quality egg marketing program. Candling and grading stations were established by this Division at New Bern, Washington and Asheville.

Poultry

This Division has continued to coöperate in so far as practicable in the marketing of this product.

WOOL

Coöperative wool sales in 1933 were quite successful. Fourteen counties, namely, Alleghany, Watauga, Ashe, Avery, Madison, Cumberland, Buncombe, Haywood, Jackson, Macon, Clay, Graham and Tyrrell, sold coöperatively 115,000 pounds of wool.

Approximately 25,000 pounds were delivered to the United Wool Growers Association with an advance of 26 cents per pound. Approximately 90,000 pounds were sold outright at an average price of 30 cents per pound. Due to an improved condition of the wool market, independent buyers were quite active.

Coöperative wool pools were conducted in five counties, namely, Macon, Buncombe, Haywood, Jackson and Madison, in 1934. The advance through the United Wool Growers Coöperative Association was 20 cents per pound on clear wool, 17 cents on light burry and 13 cents on hard burry. The upward trend in the market of the previous years led most of the growers to believe that there would be a recurrence this year and they held for a higher price which did not materialize. The number of pounds of wool received amounted to 11,657 pounds, having a value of \$3,315.98.

SAVINGS AND LOAN ASSOCIATIONS

MISS H. M. BERRY

During this period the work of the Superintendent has been devoted to organizing new associations and auditing those in existence. They have grown steadily in numbers, resources, service and number of people served. Since the banks have instituted such rigid regulations for depositors and borrowers, the working men and women, whether on wages or salary, finds it impossible to carry deposits in the commercial banks or obtain loans, regardless of how great his necessity. Further, the banks are not interested in small accounts nor in making loans without high-class collateral such as the majority of our people are unable to furnish. The savings and loan association offers a vehicle through which such classes of citizens can utilize their own savings for establishing their own credit.

We now have active organizations in the following counties:

Alamance (1); Avery (2); Beaufort (1); Buncombe (3); Burke (1); Cherokee (1); Clay (1); Catawba (1); Craven (2); Cumberland (1); Durham (6); Edgecombe (3); Forsyth (5); Guilford (3); Iredell (2); Haywood (1); Harnett (1); Lenoir (2); Mecklenburg (7); New Hanover (1); Nash (4); Rockingham (1); Richmond (3); Rowan (2); Scotland (1); Wake (7); Wilson (1).

Number of associations now active	61
Number of members	4,876
Number of depositors	1,705
Number of borrowers	10,568
Amount invested in shares	\$139,500
Amount invested in deposits	175,872
Total resources	376,892
Total loans made	1,547,784
Total interest charges	92,687
Savings in interest over average charges of loan shark	1,352,097

With the extension of this work the savings to our people can scarcely be estimated. Thirty-eight loan companies owned by a man in Chicago are now operating in this State whose average interest charge is 363%. I hear of numerous managers of plants who lend to their employees at 10% a month or 120% a year. A provision in the Revenue Act of 1933 virtually license such operations by requiring them to pay a privilege tax of \$500 to the State. This, of course, is selling the very life blood of our people for the proverbial "mess of pottage."

Where there is a great human need it will be met by an instrument of evil if provision is not made to satisfy this need with something that is good. The Savings and Loan Association provides the logical solution of this problem, provided it can be brought to the attention of those who need it. This, of course, cannot be done with the very limited resources at our disposal. We need funds for printing supplies such as are required by the growth in number of associations as well as their growth in business. We need a more liberal allowance for travel as it is impossible to meet the requirements of the work on the present allotment.

It is of interest to note that this type of organization is now taking on national significance. Thirty-six states have passed their own laws and the Congress just adjourned passed an act making it possible for any state to participate in its benefits. Just what significance this will have for North Carolina is not yet known.

ANALYTICAL DIVISION

W. G. HAYWOOD

This Division has been occupied during the past two years, as heretofore, in making analyses of fertilizers, feeds and insecticides in accordance with the provisions of regulatory laws covering the sale of these products in the State.

All of these materials are sold strictly on the basis of their chemical composition and the manufacturers are therefore required to brand upon all packages the "guarantee" that is to show, usually in minimum percentages, the active ingredients present.

Official inspectors draw samples from all parts of the State and send them to the Department where they are analyzed and the results obtained compared with the guarantees. Analysis reports are made to interested parties, published in the Bulletin of the Department and in cases where the guarantees are not maintained, penalties provided by law are assessed by the Commissioner for the benefit of the purchaser.

In addition to its regulatory work, this Division makes for purchasers and consumers a considerable number of analyses of miscellaneous materials, such as mineral waters, limestones, marls, cotton seed meals and other products connected with agricultural work in the State.

The writer attended numerous meetings and gave a great deal of time and thought to the provisions of the new fertilizer law, which was enacted by the last General Assembly, and became effective January 1, 1934.

He is strongly of the opinion that it is a great improvement over the old law which, due to changing conditions in the fertilizer industry, had become very much out of date.

The principal differences between the old and new laws, briefly stated, are that the new law requires a minimum guarantee of 14% plant food against 12% in the old law; the change in order of stating the guarantee from phosphoric acid, nitrogen (or ammonia), and potash to nitrogen, phosphoric acid and potash; (this order of stating the analysis is now in use everywhere except one or two states); and the requirement in the new law that all guarantees of mixed fertilizers shall be stated in whole numbers only, whereas the old law permitted the guarantees to be made in fractional percentages. Certain changes

were also made in the branding, which serve to give the purchaser a more definite idea of the kind of fertilizer he is buying. For instance, in all tobacco fertilizers the percentage of nitrogen in the form of nitrate must be shown as well as the percentage of total and water insoluble nitrogen. In addition to this, the maximum percentage of chlorine must be given and if on analysis, there is found an excess above a reasonable tolerance, a substantial penalty is inflicted, payable to the purchaser or consumer of the fertilizer showing this excess. The old fertilizer law contained no reference to chlorine, and we consider this a very valuable addition for the protection of tobacco growers, inasmuch as an excessive amount of chlorine present in fertilizer will have a very deleterious effect upon the tobacco plant.

During the period covered by this report, 4,887 official samples of fertilizers have been analyzed and out of this number only 159, or 3.25% fell as much as 5% below the value of the guaranteed plant food and thereby became subject to a penalty.

It may also be of interest to note that the number of samples which showed an over-run on analysis greatly exceeded those in which there was a deficiency.

For the three years prior to 1934, this Division determined as a matter of information for purchasers and consumers the percentage of chlorine in all samples of fertilizers marked especially for tobacco. Each year a lower chlorine content was shown than in the previous year. Apparently this work proved quite beneficial, as the publicity given it probably aided in causing the percentage of chlorine in tobacco fertilizers to be kept, as a rule, within limits, and also called the attention of tobacco growers to the dangers of excessive amounts of chlorine.

As stated above, under the provisions of the new fertilizer law, chlorine must be guaranteed in tobacco fertilizers, and as an excess carries a penalty payable to the purchaser a still further improvement may be anticipated.

Up to July 1st, of the current year, 1,356 official samples of fertilizers, representing a portion of the spring season, have been analyzed. Out of this number 489 were fertilizers branded especially for tobacco, and under the statute carried guarantees of chlorine stated in maximum percentages.

Under the provisions of the law 25 or 5.11% of these became liable to a penalty payable to the purchaser or consumer.

Chlorine is introduced into fertilizers in combination with potash or associated with certain sources of potash. It is there-

fore necessary that the manufacturers exercise strict chemical control over all raw materials carrying potash which are intended for use in tobacco fertilizers.

There have been no developments of particular importance in feed control work during the past two years. Such cases of adulteration, misbranding and deficiencies in analysis as have been detected have been quickly corrected, and in cases of shortages the proper penalties have been assessed by the Commissioner. In the main, the work has proceeded smoothly and the samples examined have complied substantially with their guarantees.

There have been about the usual number of samples of feed, which supposedly have been responsible for the death of stock. These usually follow prolonged spells of damp weather which sometimes cause certain types of feed to spoil if not properly stored. This is the usual cause of trouble, rather than the addition of any deleterious material.

There have been no developments of particular interest in the insecticide work.

All samples, both those drawn by inspectors and those sent in by consumers, have been analyzed promptly and reported upon. We have had no complaint as to the quality of the goods found upon the market, and the samples analyzed have shown excellent compliance with their guarantees.

The amount and kind of chemical work performed in the laboratory during the past two years is shown in the following summary:

Official fertilizers	4,887
Fertilizers and fertilizer materials for farmers	195
Official feeds	510
Miscellaneous feeds	230
Insecticides	114
Cotton-seed meals	315
Limes and marls	32
Miscellaneous	82
Total	6,365

Most of the foregoing analyses necessitated a number of different determinations. It may be of interest to note that the total number of quantitative determinations required was approximately fifty thousand.

DIVISION OF ENTOMOLOGY

DR. R. W. LEIBY

This Division is charged with the control of insects and diseases that affect man and his crops, with emphasis on the regulation of the movement of plants and plant products whereby the diseases of crops and their insect injuries may be totally prevented or suppressed.

The major activities of the division were centered about the following projects during the past biennium:

NURSERY CERTIFICATION

Inspection of nurseries constitutes the chief work of two men in this division during late July, August and September each year. A representative number of plants of each type are examined at least once each year for insects and diseases that are considered a menace to their health, whether they be sold or kept in the nursery. When a moderate amount of infection is found, the plants are immediately destroyed by the inspector. When a seriously destructive insect is found, the plants are either condemned or their transportation and sale is forbidden. When an infestation by an insect is found that can be corrected, instructions for its eradication or control are given, and a certificate permitting movement is granted, when the nursery owner has complied with the instructions of the entomology office. As a result of the regulations of the Department governing inspection and certification, together with education in insect and disease prevention, it is felt that the nurseries of the State grow and sell a quality of stock that is higher than the average.

Approximately 200 nursery properties were inspected during each of the years 1933 and 1934. Receiving certificates in the following years were: 1927—133 nurseries; 1928—148; 1929—158; 1930—166; 1931—184; 1932—164; 1933—161 nurseries.

The annual fees for nursery inspection are the same as given in the last biennial report. They vary from \$5.00 to \$25.00, the amount depending upon the acreage of stock offered for sale. The receipts for the fees have been examined by the State Auditor and accounted for to the Chief Clerk.

It is of interest to note that the acreage in nursery stock in the state has increased from 685 acres in 1920, to approximately 1,900 acres in 1934.

TAGS FOR OUT-OF-STATE NURSERIES

Approximately 25,000 permit tags were sent to out-of-state nurseries in each year of the biennium. These were attached to shipments of nursery stock sent into the state. They were mailed to 200 nurseries in 1932, and to 192 nurseries in 1933. They were issued at approximately cost and the receipts have been checked by the State Auditor's office and turned over to the Department.

It was felt that these tags were no longer useful; accordingly, the Board of Agriculture, at its meeting on July 25, 1934, rescinded the requirement that nursery stock shipments coming into the state have affixed to them a North Carolina permit tag. The regulations of the Board still require the filing of a duplicate of the inspection certificate with the Department of Agriculture, and the attachment of a shipping tag to the incoming nursery shipment, as a prerequisite for the shipping of nursery stock into the state. Shipments are examined during the winter months to a limited extent by our inspectors, to see that the nurseries are complying with the requirements.

NATIVE PLANT COLLECTORS' PERMITS

The business of gathering wild native plants such as dogwood, boxwood, kalmia, azalea and rhododendron has diminished during the past two years. A fee of \$10.00 annually has been required from each collector. Upon payment of the fee, a collector is granted a permit to traffic in the sale of native plants. The division is personally familiar with the character of the collectors and their business, and feels that with a minimum of inspection, the plants collected and sold are reasonably free of injurious insects and disease.

During 1932-1933, permits were issued to 30 collectors. During the shipping season of 1933-1934, only 15 permits were requested and granted. The fees are turned over to the department as received.

Special permit tags are sent during each shipping season to individuals who desire to send one or a few shipments of plants to points within or without the state. A charge of ten cents is usually made for such a tag.

DEALERS' PERMITS

In 1932, three dealers were granted permission to buy and sell nursery stock after they had complied with the regulations of the department. Four dealers were licensed in 1933. The dealers' permit costs two dollars annually.

In this connection, it may be stated that the division finds it impossible with the available funds, to enforce the dealers' permit requirement. With adequate funds the division could prevent the present illegal buying and selling of nursery stock in the state, as well as the traffic in stock known as peddling. It may be noted that the nurserymen of the state are desirous of laws which would place a heavy tax on the so-called nursery stock peddler. This would certainly prevent the sale of uncertified plants, and aid in the general enforcement of the nursery stock regulations and quarantines.

NARCISSUS INSPECTION AND STERILIZATION

The regular post flowering and the harvest inspections of all commercial plantings of narcissus were made during the past biennium. This is required because of possible infestation of narcissus bulbs by the eelworm and the narcissus fly. Federal regulations prohibit the interstate movement of narcissus unless they are certified as to freedom from these pests. State regulations likewise govern intrastate movement of these bulbs.

During 1933, a total of 31 commercial plantings was inspected. Of these plantings, four were found infested by the narcissus eelworm and one with the narcissus bulb fly. Approximately 8,305,091 bulbs were inspected. At the harvest inspection 34 properties offering 2,251,000 bulbs for sale were inspected. Workers in this division supervised the hot water treatment of 692 bushels of bulbs so that they could be certified as free of pests. Seventy bushels were fumigated for the narcissus fly. In addition to the above, assistants in the division supervised the hot water treatment of 140 bushels of imported bulbs in the Castle Hayne bulb treating plants. This work is done in part for the Federal Bureau of Entomology and Plant Quarantine.

During 1934, out of the 31 commercial bulb growing establishments, 26 were inspected. Four were found infested with eelworm and one was found infested with the narcissus fly. Approximately 7,747,653 bulbs were inspected.

At the harvest inspection in 1934, approximately 2,000,000 bulbs were inspected, and about one-third of them, being offered for sale and found eelworm infested, will need to receive the hot water treatment during September, 1934, under our supervision.

A relatively small number of newly imported bulbs will also need sterilization under our supervision as well as recently imported Dutch iris bulbs.

The work of the Division in connection with the inspection and supervision of treatment of narcissus and iris bulbs because of the eelworm, has increased materially in the last two years. It comes at a time when our workers are otherwise engaged. It is imperative, therefore, that arrangements be made whereby a temporary worker is granted and trained to supervise the required hot water treatment. Requests for such a worker have recently been made by the writer. The services of the worker are essential if we are to meet the requirements of the Federal Bureau which enforces a Federal quarantine and our own state quarantine governing the movement of certified narcissus bulbs. Under present circumstances the department is not able to coöperate fully with the very extensive commerical flower and bulb industry of our state.

It is worthy of note that our inspectors have found two new species of eelworms in narcissus bulbs at Castle Hayne. They are *Acrobeles* n. sp. and *Corylaimus* n. sp. It is not known if these species will or will not prove a pest of narcissus bulbs in the future.

Most of the time of two assistants is given to narcissus inspection during the months of April, May and July; and the part time of one assistant during September and October.

BEE DISEASE ERADICATION AND APIARY CERTIFICATION

In 1933 and 1934, the queen breeding apiaries of four and five commercial queen breeders were inspected and certified as free of bee diseases. This work necessitates the examination of approximately 650 colonies of bees. Certificates permitting the movement of queen bees are not granted when the apiary is found diseased by European or American foulbrood.

An outbreak of a new bee disease known as Parafoulbrood was investigated during May of 1934. This bee disease is not general and is known to occur only in a few states.

It is important that this disease be eradicated from the state. A preliminary survey shows that the infected area is

limited to eight apiaries located within a 25-mile circumference that includes the contiguous corners of Sampson, Duplin and Pender counties. Seventeen apiaries owned by nine beekeepers were inspected and these included 444 colonies. Eight of the apiaries were found infected with Parafoulbrood.

The owners of the colonies affected with this disease have been sent instructions how to eradicate it. If time and funds permit, we will make further inspections to see whether the disease has been eliminated from some of the apiaries or if it has spread to other apiaries. Outbreaks of bee diseases like Parafoulbrood point to the need for one assistant to give his full time to the eradication of bee diseases in this state.

PEST MOSQUITO CONTROL

Much of the time of the State Entomologist between December 15, 1933, and May 1, 1934, was given to the direction of a pest mosquito control program with C W A funds in Cartaret, Craven, New Hanover and Brunswick counties. The writer was actively associated with the mosquito control project and worked under the supervision of Dr. F. C. Bishopp, of the Federal Bureau of Entomology, through whose office funds for this work were made available in many states by the Civil Works Administration.

The object was to employ labor to drain by ditching salt marsh areas in eastern North Carolina as far as funds would permit. The work was confined to the four above-mentioned counties. Salt marsh areas were drained by digging ditches through them at proper intervals, if they were regarded as likely places where species of pest mosquitoes could breed or were known to be breeding.

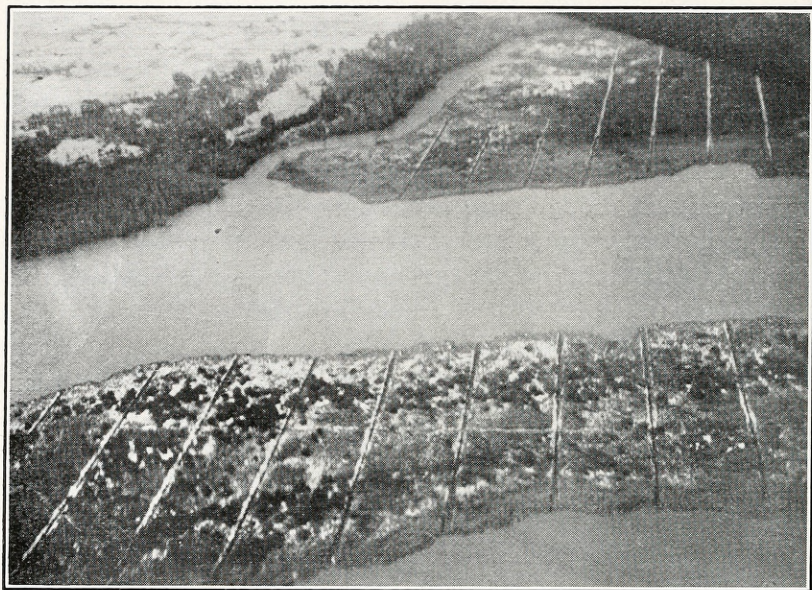
A skilled supervisory staff included the following engineers: Philip K. Ball, in charge of Cartaret county, and later Assistant State Director; B. M. Potter, in charge of Craven county; G. T. Morgan (later succeeded by Paul F. Kibler), in charge of New Hanover county; Percy Canaday, in charge of Brunswick county. These were assisted by Morgan Hand, engineer associated with the Federal Bureau of Entomology; B. A. Phelps, engineer in Cartaret county, and J. A. Ferree, chief clerk and entomologist in charge of the the Wilmington, N. C., branch office of the Pest Mosquito C W A project. An additional corps of draughtsmen and surveyors completed the skilled labor personnel. As

many as 950 unskilled laborers were employed at the peak labor period of the project.

Records in the insect survey of this division showed that three species of mosquitoes were known to breed in our salt marshes. These are *Aedes taeniorhynchus*, *Aedes sollicitans* and *Culex salinarius*, the first two species being by far the commonest ones. Although these are not now regarded as carriers of organisms producing a disease like malaria, they are known to be pests to the point where human habitation near their breeding places is almost or quite impossible.

Drainage work was begun on December 15, 1933, and continued for three and one-half months with some interruption, due to a change in supervision of the project from Federal to State. All ditches were dug by hand with spades or shovels or similar equipment. The standard ditch was dug 10 inches wide and 22 inches deep. Other larger main canals and ditches were 12, 14 or 16 inches wide and 22 to 25 inches deep. The ditches were dug from 100 to 300 feet apart, the intervening distance depending upon the type of marsh, the presence or absence of natural guts, the character of the soil and its growth, and the rise and fall of the tide.

Definite subprojects were followed in each county. As many as ten areas (subprojects) of 50 to 2,000 acres each in extent were partly or wholly drained by ditches in Cartaret county. Laborers were at work in this county in as many as six different areas at the same time, thus giving employment to natives in different parts of the county. In Craven County two subprojects covering two large marsh areas adjacent to New Bern were drained so that, although the tide can now flow into the ditches and upon the marsh area, the water is also readily drained from the marsh as the tide recedes. Water does not remain long enough in the marsh area, therefore, to allow mosquito breeding. In New Hanover county the brackish marsh areas along the Cape Fear River and Eagle Island, and the salt marsh areas around Fort Fisher section, Carolina Beach and Wrightsville Beach were the chief subprojects. It is certainly obvious that mosquito breeding was materially lessened in these important resort sections. In Brunswick county the salt marsh areas in the vicinity of Southport and the brackish swamp areas on the west side of the Cape Fear River as far north as Orton Plantation were drained.



AERIAL VIEW OF SALT MARSH DITCHES AT NEW BERN, N.C.

—Photo March 15, 1934, by W. V. King.



TWENTY-INCH DITCH IN NEWPORT NARROWS SALT MARSH OF 2,200 ACRES. BREAKS IN THE ROWS OF DUG OUT PEAT PERMIT THE WATER TO FLOW OFF THE MARSH INTO THE DITCH. THE HEAPS OF SOIL IN THE BACKGROUND INDICATE LATERAL TEN-INCH DITCHES.

—Photo March 15, 1934, by W. V. King.

It is to be noted that a marsh which was almost an impenetrable bog prior to the digging of ditches in it, became firm after it had been systematically ditched; firm to the point where an automobile could be driven over it. This type of drainage by ditches most certainly makes it impossible for water to stand in pools in the marsh areas long enough to allow a mosquito larva to reach maturity. Mosquito breeding is therefore, impossible. Inquiries made by the writer regarding the abundance or absence of mosquitoes during the summer of 1934, point very definitely to an appreciable control of pest mosquitoes in the four counties where ditching was done during the winter of 1933-1934. In counties where no drainage was done, mosquitoes were as numerous as usual.

In connection with the many subprojects in the various counties, more than 100 maps and blueprints drawn to scale have been prepared showing in detail the location and size of the ditches that were dug in the marsh areas. These are on file in the entomology division's office. There are also available a long series of photographs taken from the ground and from an airplane, full weekly reports, showing the progress of the work, weekly records of costs and expenditures, descriptions of the areas ditched and equipment expenditures. Surveys have also been made which describe the character and acreage of marsh lands in Cartaret, Craven, New Hanover and Brunswick counties which remain to be ditched in order to effect a more complete control of pest mosquito breeding. These surveys will probably have a future value.

A summary showing the footage of ditches dug and the cost of the work is as follows:

Ditches dug equivalent to a linear ditch 10 inches wide	
and 22 inches deep	2,183,498 feet
Ditches cleaned	82,218 feet
Linear miles of ditches dug and cleaned combined	429 miles
Expenditures:	
Labor (skilled and unskilled)	\$103,454.41
Equipment and office expense	5,300.07
Total expenditures	\$108,754.48

The writer feels that the funds for the prosecution of this project were well expended. One of the important objects was to supply labor to the unemployed. It will be seen that the overhead (cost of equipment and office expense) was less than 5 percent of the total expenditures. The average cost for dig-

ging the ditches was approximately \$253.00 per mile, or about 4.8 cents per foot. In marshes where no stumps were encountered and where the areas were extensive and thus permitted the digging of ditches that were nearly a mile long, the cost was reduced in some instances to 1.8 cents per foot.

It would seem desirable for the State in coöperation with the counties in eastern North Carolina having salt marsh areas, to undertake in the future to ditch the marsh areas so as to effectively suppress, if not eliminate, the breeding of the pest mosquitoes in our salt marshes. To do so would require the expenditure of from two to three million dollars, using hand labor paid at a rate of about 40 cents per hour. The same ditching could be done for much less by using ditching machines. The prevention of pest mosquito breeding in eastern North Carolina appears to be one of the prerequisites for the more extensive cultivation of fertile lands in the east, and the further establishment of coastal summer playgrounds.

INSECT SURVEY

In the last biennial report, it was reported that 8,541 species of insects were known to occur in the state. This list has increased to 8,792 species in the last two years. The total number of species including the "near" insect is 9,226.

This insect survey occupies about half the time of one assistant and part time of others at short intervals. All of the members of the staff collect specimens at times. Specimens are kept mounted and assembled in insect boxes. Our state now has the largest number of insects recorded of any in the Southeast.

An article describing the "Insect Survey Work In North Carolina" by R. W. Leiby appeared in the *Journal of Economic Entomology* for August, 1934, Vol. 27, No. 4, pp. 735 to 739.

The list of North Carolina insects is in manuscript form. It is hoped that it will soon be made available for public distribution in printed form.

ORIENTAL FRUIT MOTH PARASITE DISTRIBUTION

During July, 1934, the Department through the entomology office entered into a coöperative agreement with the Federal Bureau of Entomology and Plant Quarantine to assist in the distribution of parasitic wasps in commercial peach sections of the state, in an effort to reduce damage by the Oriental moth. Approximately 4,000 parasitic wasps were accordingly liberated

in ten peach orchards at West End, Candor, Marston, Belmont and Raleigh. These represented three species of parasites recently imported from Japan and Korea by the Federal Department of Agriculture and bred in large numbers at the parasite laboratory in Moorestown, N. J.

It is expected that these parasites will be able to establish themselves under North Carolina climatic conditions and thus eventually reduce the injury to peaches by the larvae of the Oriental Moth.

It is of interest to report that two native species of parasites, liberated two and three years ago for the same purpose, have become established at Raleigh and in the Sandhills peach section. They are reported by commercial growers as reducing injury by the Oriental Moth especially in late ripening varieties of peaches. Control of the Oriental Moth by means of parasites would be especially desirable since it cannot be controlled by sprays.

BLISTER RUST OF WHITE PINE PREVENTION

In July, 1933, the department through the division of entomology entered into a coöperative agreement with the Federal Department of Agriculture whereby certain plants known as Ribes should be located in white pine areas. The Ribes being an alternate host of the blister rust of white pine were to be pulled up and the entrance of the disease into North Carolina is thus to be prevented or delayed.

A limited amount of funds is provided by this department, but the larger amount by far comes from N I R A funds through the Federal Department of Agriculture. The work is under the immediate direction of the state entomologist with a state leader, J. A. Ferree, in active charge, who works from a branch office in Asheville.

During the summer of 1933, the work on this project was confined to the state and federal national parks which were scouted by blister rust control checkers, working entirely under federal supervision. This work resulted in the removal of 132 wild and cultivated currant and gooseberry plants that were found growing within an infective distance of a white pine stand. A total of 2,010 acres were thus freed of these bushes which are practically worthless; and the possibility of an infection of white pine trees by the blister rust is thus reduced to a minimum. On the National and State Park areas, there remain

some privately-owned lands which will need scouting and the Ribes that are discovered removed.

In April, 1934, work was begun leading to the active removal of all wild and cultivated currant and gooseberry bushes in the state that are growing within an infective distance of a white pine tree, or within areas set aside by state regulations as blister rust control areas. Field headquarters is in room 604 of the Buncombe County Court House. Approximately \$25,000 is available (largely through N I R A funds) for the employment of a personnel which now includes about 40 workers. Seven districts, including from two to ten counties, in which white pine is grown, are being scouted under the direction of seven supervisors who are trained in forestry or insect and disease control. They are assisted by four scouts and a corps of 28 laborers. Weekly reports of the activities of these workers are made to the department through the Asheville office and the State Entomologist.

The laborers are trained under the scouts and district supervisors to scout white pine areas which have a value for commercial or aesthetic reasons, for cultivated or wild currant and gooseberry bushes. When these are found, the permission of the owner is secured to pull up the bushes. To August 25, 1934, the white pine acreage covered and the offending bushes removed includes the following:

Acres of white pine scouted	357,481
Ribes pulled (cultivated)	43,177
Ribes pulled (wild)	11,719
Total Ribes bushes removed	54,896
Number of counties worked	7

In conducting the eradication of Ribes, it has been found necessary for the Board of Agriculture to promulgate rules and regulations which govern the movement of white pine trees and the planting of currant and gooseberry bushes in the state. Suitable rules and regulations were, therefore, adopted July 25, 1934, by the Board of Agriculture, which empower the Commissioner to determine the boundaries of areas (counties or parts thereof) in which currant and gooseberry bushes may not be grown within an infective distance of white pine trees. They also determine conditions under which white pine nursery stock may be grown. These regulations are soon to be available in printed form.

The Blister Rust coöperative project is expected to be continued actively at least until July 1, 1935. It is hoped that by such time, nearly all of the enormous white pine acreage (both native and planted) will have been scouted and the Ribes bushes either eradicated or grown only under surveillance. Such scouting and eradication will most certainly delay the entrance of the blister rust of white pine into the state, or at least slow any spread of the disease should it gain a foothold, and thus make any outbreak easy to eradicate.

MISCELLANEOUS PROJECTS

Japanese Beetle

Traps placed by the Federal Bureau of Plant Quarantine in approximately 25 towns and cities in the State during June and July of 1933, revealed a general spread of the Japanese beetle over the state. Twenty points were found infested, but the small number of beetles caught in each trap indicated a very light infestation.

A lack of funds prevented either the Federal Bureau or the State Department of Agriculture from placing traps over the state during the summer of 1934. Hence nothing is known of the intensity of the infestation or the further spread of the beetle.

Provision should be made for determining the beetle infestation and population during the next biennium. The beetle has not as yet appeared as a pest in this State.

Pink Bollworm of Cotton

A small amount of scouting has been done during the biennium for the pink bollworm of cotton. It has not been discovered. Trash machines, which sort likely infested cotton trash from gins, have been operated by the Federal Bureau of Entomology during two fall seasons, but no infestation has been found. It is to be noted, however, that during the past two years the pink bollworm has been found in North Florida and Southern Georgia.

Phony Peach Disease

Five counties of North Carolina are still included in the quarantine regulations of many states as infected with the phony disease of peach trees. There is probably only a very little infection really present in these counties and funds should

be made available for a thorough inspection, so that any infected trees found may be destroyed.

Inspection of peach trees for the phony disease in the vicinity of nurseries located within the supposedly infected counties was made during September, 1934, by a federal inspector and an assistant in this office. They were made in Moore and Montgomery counties. Several suspiciously phony trees were found and samples of their roots submitted to the Federal laboratory at Fort Valley, Ga., for observation. If the trees are determined as infected with the phony disease, they will be destroyed. Further scouting of the environs of nurseries located in infected counties will be continued.

Outstanding Pests

The usual number of insect pests destroying crops, received the attention of the entomology division by correspondence and by personal visit. Perhaps the one group of insects of which complaints were most frequent, was Termites. The evergreen bagworm was quite destructive in both years. The corn earworm was quite destructive in 1934. The cotton boll weevil was not destructive in either year. Household ants gave more trouble than usual. The Mexican Bean Beetle was unusually destructive in 1934. Powder Post Beetles in houses, elm leaf beetles on elm trees, fleas in dwellings, borers in cantaloupe vines and weevils in stored grains—all were more destructive than usual in the past two years.

Public Insect Exhibits

In 1933 and 1934, members of the division were in charge of insect exhibits on eight occasions. These included the picnic days at the test farms and at the State Fair. It is felt that the public gains not a little knowledge of the habits and control of insects at these exhibits.

Public Lectures—Correspondence

Mr. C. S. Brimley of the division and the entomologist made a total of ten public talks and eleven radio talks during the biennium. These concerned the habits and control of insects, garden club talks on bulb and shrub culture, birds, reptiles and nature study. Some of the talks were illustrated by lantern slides. Copies of some of these talks have appeared in the *Agricultural Review* and in the press.

The division workers attended to the usual amount of correspondence, the issuing of certificates, shipping tags for the movement of nursery stock and the preparation of reports.

ACKNOWLEDGMENTS

In concluding this report, I acknowledge your continued interest and support in our entomological work. It is a pleasure also to refer to the loyal and efficient service of each member of the entomology division.

DIVISION OF BOTANY

J. L. BURGESS

The Division of Botany of the Department of Agriculture is charged with the following lines of work:

First: The examination and testing, for purity and germination, of field, garden, flower, tree, and herb seed.

Second: The identification, study, and control of noxious weeds.

Third: The manufacture and distribution of pure nitro-cultures for the inoculation of the seeds of the different legume crops.

Fourth: The placing of commercial grades on grains.

Fifth: Recleaning and treating tobacco seed.

NOTES ON THE STATE SEED LAW

The North Carolina State Seed Law was enacted for the purpose of promoting the use of better seeds among the farmers to the end that the farms of the State might produce greater yields of better crops at less cost, and for protecting agriculture against fraudulent practices on the part of the seed trade.

In its operation the law enables the dealer to secure good seed by having samples of a prospective purchase tested before the purchase is made; it protects the farmer against the purchase of poor seeds by enabling him to have his seeds tested in the State Seed Laboratories in order to check statements made by the dealer, and the public by protecting its food supply against being reduced by crop failure due to the use of poor seed.

Any citizen of the State can have his seed tested in the State Seed Laboratories free of charge, but a charge of twenty-five cents is made for each purity and each germination test when done for parties living outside the State.

The North Carolina State Seed Law does not in any way interfere with the freedom of contract as any farmer can purchase seeds of any degree of purity and viability he may choose, *provided* the dealer writes in the face of the State Seed Tag all the facts about which the farmer may care to know, such as the per cent of purity, viability, and the date tested. *THE DEALER MUST SEE THAT THE FARMER KNOWS WHAT*

HE IS PURCHASING AT THE TIME THE PURCHASE IS MADE.

The law provides that "Every package of seed weighing ten pounds or more, sold to a farmer for seeding purposes, shall have attached to it a State Seed Tag," showing all the facts above-mentioned. Of course, the Commissioner of Agriculture has the power to withdraw from sale any seeds he finds entirely unfit for planting, as well as all seeds when sold in violation of law.

All seeds sold in the State by seed dealers must be sold under authority of license in the name of either the retail dealer or the wholesale dealer. In case of a retail dealer selling seeds without license, he must sell **ONLY THOSE SEEDS** which he has purchased from a wholesale house that **HAS LICENSE TO SELL SEEDS IN THIS STATE**. In case of a wholesale house selling seeds in North Carolina, it must sell under a license taken out in its own name or sell to only those retailers who do have a license to do a seed business in North Carolina.

Section No. 18 of the State Seed Law permits dealers to use the term "Standard Seed" only in case the face of the State Seed Tag shows a percentage of purity and germination equal to that required in said section.

The last Legislature made some revisions in the State Seed Law, the most important of which was the adding of "Wild Oats" to the list of noxious weeds in Section No. 6. It also provided that "Mixed Feed Oats," which is mostly wild oats, must not be sold in the State except in a finely-ground condition. This legislation was necessary to keep wild oats from becoming a common weed pest in the grain fields of North Carolina.

For the past several years the Department of Agriculture has been encouraging the production of pure-bred and higher-yielding strains and varieties of crop seeds in North Carolina in order that our farmers might the more successfully cope with the difficulties incident to buying seeds from other states, which seed might not be adapted to our soils and climate, or otherwise suited to the local agricultural needs of the State. The 1929 Legislature, through the influence and activities of the Commissioner of Agriculture and others, enacted Chapter 325, providing for the production and certification of crop seeds for North Carolina farmers. The Department of Agriculture is largely financing this movement for the production of better crop seeds and is co-operating with the College in carrying out

the provisions of the law. The Commissioner of Agriculture is an ex-officio member of the Board having executive supervision of and control over the production and distribution of pure crop seed in the State. The Pure Crop Seed Act was in force from and after its ratification.

The results following the enactment of the Certified Crop Seed Law show the time was fully ripe for such legislation. The following table presents, in concise form, the progressive results of the North Carolina Crop improvement Association from its formation in 1929 to the beginning of 1932:

VOLUME OF SEED INSPECTED AND CERTIFIED BY THE NORTH CAROLINA
CROP IMPROVEMENT ASSOCIATION

*Coöperating with the College and State Department of
Agriculture, 1929-30-31*

<i>Seed Crops</i>	<i>Bushels Certified 1929</i>	<i>Bushels Certified 1930</i>	<i>Bushels Certified 1931</i>
Corn	4,206	7,178	6,615
Wheat	1,500	7,771	10,300
Oats	2,010	8,075	49,060
Rye	200	1,395	3,675
Barley	1,560	1,150	5,205
Soybeans	303	679	22,420
Lespedeza	600	6,000	40,000
Cotton	19,097	29,156	41,065
Irish potatoes	1,400	830	1,540
Tobacco		625 ozs.	1,950 ozs.
Sweet potatoes	1,000	1,075	5,000
Grand Total	31,876 bus.	63,309*	184,880 bus.

Perhaps the volume of work done by the Seed Laboratory can be better comprehended when we know that samples of all the seed certified in the above tabular statement had to be examined and reported to the officials of the Association before certification could be made.

SEED LABORATORY

There have been received and tested in the seed laboratory the past two years a total number of seed samples amounting to over eight thousand.

*Tobacco seed not included.

Tobacco Seed

The months of December, January and February are largely given over to the recleaning of tobacco seed sent to us by the farmers. The past two years we recleaned over nine hundred pounds for over 430 farmers.

Seed Tags

The past two years we distributed three hundred sixty-two thousand, five hundred and eighty-two (362,582) seed tags.

Nitro-Cultures

The demand for pure cultures for legumes is still quite strong, showing that the State has much land not yet properly inoculated with nitro-cultures.

Plant Identification

We have had to give considerable time to plant identification. More and more attention is being given to the identification of drug plants and plants poisonous to livestock.

Grain Grading

Since our grain-grading service was established we have had eight hundred and two (802) cases of disputed shipments of wheat, corn and oats submitted to us. Some of these cases involve large sums of money, and before this service was established, the millers of the State sustained much loss in the acceptance of inferior grains from distant shippers. The Botanist of the Department is the Federal licensed grain inspector for North Carolina and South Carolina.

SEEDS OF LOW VIABILITY

It must not be assumed that in every case a seedsman is selling seeds of low viability because our report shows his seed had a low percentage of germination, because many dealers send us their old left-over seeds in order to ascertain their value for the current year's trade. Of course, seeds of low vitality may be offered for sale, but the farmer should always demand the analysis, showing the quality of the seed, to be placed on the tag. Then the farmer should always send the State Seed Laboratory a small sample as a check on the seedsman's guarantee as shown on the seed tag. Farmers should demand the use of the State seed tag in all cases as this is their privilege and only guarantee of quality.

DIVISION OF FOOD AND OIL INSPECTION

WM. M. ALLEN

The object of the work of the Division is to protect the health, life and financial interest of the people of the State in the purchase of foods, beverages, linseed oil, illuminating oil and gasoline.

The work is provided for and carried out under the following laws: pure food, bleached flour, standard weight meal and flour, sanitary bottling plant, bakery, creamery, ice cream plant and cheese factory, linseed oil, illuminating oil and gasoline inspection laws.

The enforcement of the food laws prevents the manufacture or sale of adulterated or misbranded foods and beverages, and the collection of the inspection taxes under these laws is to enable the Division to enforce the various laws.

The funds collected under the various laws as inspection fees by the Division are legally for the enforcement of the food law and the various other sanitary inspection laws, but the Division does not get enough of the funds collected to properly enforce the said laws.

The bleached flour law requires artificially bleached flour to be labeled artificially bleached so that its appearance will not be misleading to the purchaser.

The sanitary soft drink bottling plant, bakery, creamery, ice cream plant and cheese factory inspection laws require that these food producing plants be operated under sanitary conditions so that the food products produced by them will not be deleterious to health and a menace to the people of the State. The creamery, ice cream and cheese factory inspection law has now been amended so that it applies to all places that make frozen products for sale, such as frozen custard, milk ice, sherbet and all other similar products and it is hard to make the operators of these places keep them in a sanitary condition.

The linseed oil inspection law requires all linseed oil and substitutes for same to be plainly labeled what they are and these products must meet the standard requirements in quality.

While we make the analyses of illuminating oil and gasoline, we have nothing to do with the inspection and securing samples of these products. These samples are secured by the Revenue Department.

Reguar inspections have been made of the following plants:

Bakeries	139	Inspections	875
Bottling plants	156	Inspections	963
Creameries, ice cream plants, cheese factories	152	Inspections	785
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Total number of plants.....	447	Total inspections	2,622

Since these laws have been in effect these plants have made great improvement in the sanitary condition under which they operate. While the larger plants and a good many of the smaller plants are so conducted that they fully meet the requirements of the law, there are some small bakeries and bottling plants that must have regular attention or the products put out by them will be a menace to the health of the people of the State, and an injustice to the business of plants meeting the sanitary requirements.

Some of the smaller ice cream plants and places where frozen custard, sherbet and other similar products are made have to be dealt with firmly to prevent them from imposing upon the public by making and selling food products that would be below State standard in quality and deleterious to health. It is difficult for less intelligent people to understand the importance of operating their food producing plants as is necessary for safety, and some of them are inclined to feel that such requirements are unjust interference with their business, but the inspectors explain to them that they have no right to endanger the health of the people of the State by operating their places for making food products in a dirty and insanitary manner.

The food and sanitary inspectors of the Division are exceptionally good men and do their work the best they can with the funds available for the work.

The oleomargarine work has recently been transferred to this Division, which adds a good deal to the work of the inspectors. The law requires al parties handling oleomargarine to have license, and all such places as hotels, restaurants and boarding houses to have a placard with the words "Oleomargarine Served Here" displayed in a conspicuous place in each dining room. The inspectors have to inspect all such places and have found that more than twice as many places are not handling or serving oleomargarine as are handling or serving it.

Handling or serving oleomargarine.....	1,038
Not handling or serving oleomargarine.....	2,869
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Total number of places inspected.....	3,907

The inspectors have to go to all stores handling food products and look over the stocks of goods sold. They collect samples of food products and pay for the samples. As they get small quantities, the price is high.

The Division has received and analyzed official samples of foods, beverages, and linseed oil taken from all over the State by the inspectors; a large number of samples of illuminating oil and gasoline sent in by the Revenue Department; also a good many samples of various things sent in by people over the State who insisted that they be analyzed and tested for various things, including poison.

SAMPLES RECEIVED AND ANALYZED

Foods and beverages for adulteration and misbranding	2,743
Foods and beverages for poison and dope	130
Drugs and medicines for poison and other objectionable substances	35
Beverages, home brew, whiskey for alcohol and dope	139
Water for mineral and drinking purposes	35
Water for objectionable substances for steam boilers	22
Water and fish from streams for substances that killed fish	11
Human milk for suitable quality for infants	4
Human viscera for poison	3
Animal viscera for poison	32
Fruit for spray residue	60
Linseed oil	193
Lubricating oil	167
Gasoline, unofficial	124
Gasoline, official	13,980
Illuminating oil, unofficial	34
Illuminating oil, official	4,467
Paint and cleaning oil	13
Miscellaneous—coke, coal, fuel oil, etc.	91
Total number of samples analyzed	22,283

As food shipped into the State is subject to the Federal law most of the food samples examined were for the detection of adulteration, misbranding or misrepresentation, more attention being given to food products manufactured in the State, such as ice cream and other frozen food products, and to other products shipped into the State in bulk, properly labeled to meet the requirements of the Federal food law in interstate shipments, but which, after being received in the State, are repacked and relabeled and, some of which, is offered for sale in violation of the State food law. These products are often adulterated, misbranded and misrepresented after they are shipped into the

State. In this class will be found such products as adulterated coffee, labeled and sold as coffee; compound vanilla extract, labeled and sold as pure vanilla extract; spirit of distilled vinegar, labeled and sold as vinegar; adulterated honey, labeled and sold as pure honey.

LINSEED OIL

Good many samples of linseed oil have been received and analyzed but comparatively few have been found that were adulterated, misbranded or misrepresented in their sale.

ILLUMINATING OIL AND GASOLINE

A large number of samples of illuminating oil and gasoline have been analyzed. Not a great many of the samples have been found that did not meet the requirements, but some of the oil samples did not come up to the State requirements. Some of the samples of gasoline have also been analyzed that did not meet the State standard requirements, since the new State standards for gasoline have been adopted. When this Division completes the analyses of illuminating oil and gasoline the results are sent to the Revenue Department.

Because of newly developed chemical methods for making gasoline from the crude petroleum, the quantity produced from the crude has been increased greatly, and, generally speaking, the quality improved, but in some cases objectionable substances have been allowed to remain in the gasoline until their elimination was required under the law. The corrosive substances are fairly easy to detect and determine, but the gasoline improvers and anti-knock substances are problems to be solved.

The Division is frequently called upon to make chemical analyses of various things which are not provided for by any of the inspection law under which it operates, nor are they provided for by any other State laws. The analyses of some of these articles are difficult; some are long and tedious, such as testing human and animal viscera for poison. The Division does not attempt to do all of such work requested, but when it appears that an analysis would serve a worthwhile purpose and tend to prevent crime or be helpful to the citizens of the State and there is no other provision for the examination being made, the work is usually done.

Chemical examinations are made of foods, beverages, medicines, human and animal viscera for poison, drugs for cocaine, opiates and narcotics to aid officials in enforcing the criminal laws to prevent crime.

During the past biennium considerable unofficial work was done for orchards to determine whether the arsenic residue from spray on apples to be shipped in interstate commerce, some of which were to be exported, exceeded the tolerance permitted by the United States Department of Agriculture.

STATISTICAL DIVISION

FRANK PARKER

WM. H. RHODES

North Carolina has been particularly favored agriculturally during the 1934 season. The condition of the crops, compared with the past ten years average, places the State in the rank of fifth as regards crop conditions in the nation. The productions of some of the major crops show considerable reductions from a year ago, due principally to acreage reductions.

As a result of national crop reductions, both by legal procedure and drought conditions, rising prices have placed the farmer in a much more satisfactory situation than for the past several years. The following table shows the prospective 1934 crop production in North Carolina:

NORTH CAROLINA CROPS SEPTEMBER 1, 1934

<i>Crops</i>	<i>Acreage</i>	<i>1934 %</i>	<i>Production</i>	
	<i>1934</i>	<i>of 1933</i>	<i>1933</i>	<i>1934</i>
Corn, bushels	2,464,000	107%	40,713,000	49,280,000
Cotton, bales	964,000	88	684,000	656,000
Tobacco, pounds	541,000	80	506,763,000	400,900,000
Oats, bushels	215,000	105	3,206,000	3,440,000
Wheat, bushels	434,000	111	3,714,000	4,253,000
Hay, tons	699,000	103	563,000	664,000
Peanuts, pounds	239,000	115	231,181,000	262,900,000
Irish potatoes, bushels	89,000	116	7,573,000	10,324,000
Sweet potatoes, bushels	83,000	98	6,794,000	8,300,000
Soy beans, bushels	84,000	110	1,320,000	1,218,000
Cowpeas, bushels	40,000	130	-----	-----
Pecans, pounds	-----	-----	741,000	586,000
Apples, bushels	-----	-----	3,386,000	3,000,000
Peaches, bushels	-----	-----	1,857,000	2,312,000
Pears, bushels	-----	-----	206,000	188,000
Grapes, tons	-----	-----	4,461	4,350

Our importance in cotton, tobacco, peanuts and hogs has been well demonstrated during the past year, and fortunately the Statistical Division, with the mass of statistical data available, placed North Carolina in the most favorable position of any of the states in its ability to coöperate immediately with all of the requirements of the President of the United States in projects to aid our farmers.

STATISTICAL WORK ESSENTIAL

Whenever county information was called for, it was ready long before the State Boards of Review were ready for their county reviews. The cotton and tobacco check-ups of acreage performance were made in July and August of 1934. After these were assembled, it was proven that the Statistical Division's figures were more reliable than previously considered by the state and county agricultural leaders.

FULL CO-OPERATIVE AID EXTENDED

The coöperative aid extended by the Crop Reporting Service to the various Agricultural Adjustment Administration programs has been tremendous and quite essential to their success. Of course, the county figures were the basis of studies. The Farm Census results, therefore, came into high favor and usefulness. Other states have been most envious of North Carolina's advantage through these yearly farm surveys. This fact has been frequently stated by government officials. That North Carolina's cotton reduction program went over so smoothly and satisfactorily was due in a large measure to the basic county figures developed in this Division.

DEPARTMENT'S FUNCTION IMPORTANT

The State Department of Agriculture holds a big and important hand in all of the A. A. A. commodity programs. That the Agricultural Statistician is the only official definitely required on the State Board of Review, tells its own story. The co-operative relations between the State and Federal statistical services are now doubly valuable and advantageous.

REGULAR WORK INCREASED

The regular crop reporting work has also gone ahead with enlargements and importance. The addition of federal assistants and clerks has been most fortunate, relieving the State of increasing delays. The New Deal and Agricultural Recovery programs are naturally increasing the demand for general services of this Division. Probably no other Division of any Department of the State has been so heavily loaded with work as has this one during the past year.

FARM FORECASTER RECOGNIZED

The *Farm Forecaster* is now accepted as the official source of agricultural information in North Carolina. It is quoted and called for all over the country. While this information is faulty, it is the best available.

The personnel of the Division of Statistics are highly efficient, though poorly paid. They make no complaint, but the contrast in salaries in the same office, for the same duties, between State and Federal employees, emphasizes the low State rating of your expert workers. This inequality extends to all of our statistical workers.

FIELD WORK BASIC FEATURES

The crop meter work has developed into quite a dependable source of acreage information in determining yearly approximations. The cotton boll and field counts are also depended upon. The Statisticians and reporters alike make these field counts all over the State's cotton belt. Last August your Statistician made a 6,000-mile boll count trip through the cotton states east of the Mississippi River for the United States Crop Reporting Board.

The importance of field investigations by frequent trips is obvious. Written reports alone cannot picture conditions or account for irregularities. Causes and effects are various and to be understood must be seen and studied.

WEAKNESS EXISTING

The three weaknesses of the Statistical Division are:

1. Inadequate development of the Farm Census Surveys.
2. Low salary grade for statistically trained employees.
3. Inadequate working quarters.

At this writing, there are an average of almost six workers per room in the statistical offices. Obviously, confusion and inefficient work results. Because of this condition, some of the Federal workers will have to be removed to State College where the State Corn-Hog Board of Review is also located. As the statistician is chairman of this board, quarters in the Department of Agriculture would have been more appropriate and would have given this department greater recognition all over North Carolina. The College was eager to provide abundant space, again for obvious reasons.

A fourth feature has been insufficient research opportunity for improving crop estimating methods. This, however, is now being studied by the emergency federal assistants whenever opportunity permits.

STATE'S INTERESTS SERVED

The Federal Agricultural Statistician stands ready at all times to serve your interests, as he has done during the past years. All expenditures have been on an economical basis. We have sought increases only where the conditions warranted them, especially in the present farm distress emergency.

FIVE YEARS' RESULTS OF THE STATISTICAL DIVISION

	1929	1930	1931	1932	1933
1. Number schedules sent	174,187	182,984	227,974	215,867	214,586
2. Number schedules received.....	27,244	32,620	33,538	37,362	38,171
3. Number letters sent.....	4,847	4,368	7,463	64,372	37,812
4. Number letters received.....	6,271	7,642	6,650	5,914	7,022
5. Number papers received.....	1,481	1,571	1,428	1,199	1,133
6. Number <i>Farm Forecasts</i> sent.....	30,350	33,700	11,800	11,000	20,000
7. Number crop report releases sent.....	109,186	94,400	95,100	65,526	56,890*
8. Census farms reported	200,239	217,337	206,000	208,000	214,774
9. Number aids' judgments used for reports:					
a. Regular monthly inquiry.....	5,207	7,222	7,700	9,074	8,227
b. Cotton (regular)	4,161	3,627	4,490	4,076	3,751
Cotton (ginners)	1,329	545	573	788	1,448
Cotton boll counts (aids and statist.)	938	962	835	863	762
c. Rural Carrier Acreage—September...	4,716	4,459	4,515	4,210	4,677
d. June Acreage	994	704	882	692	952
e. March Intentions to Plant.....	1,064	1,139	1,049	818	869
f. Livestock:					
Rural Carrier Survey—June.....	3,400	3,001	3,477	3,510	5,047
Rural Carrier Survey—December...	2,797	2,796	3,595	3,595	3,569
Disposition of Livestock—January...	564	255	783	462	574
Special April Survey.....		695			
g. All special reports.....	4,332	4,835	4,873	3,249	4,663
h. Tobacco sales	703	761	655	505	664
i. Price reports (begun July, 1932).....				1,370	3,303
Total reports used:	30,205	31,001	33,427	33,212	38,506
10. Regular salaries	\$12,900	\$13,200	\$10,470	\$8,888	\$7,680
11. Farm census clerks	\$ 4,533	\$ 3,601	\$ 2,494	\$ 1,893	\$ 2,586†
12. Expenses (other than salaries).....	\$ 4,315	\$ 3,904	\$ 1,637	\$ 1,924	\$ 2,910

NOTES: *Mimeographed crop report releases reduced lately, due to issuance of *Farm Forecasts* and steadily increased regular duties.

†Census special clerical expenses included Mrs. Drake's salary in 1933-34, not carried in previous years.

THE STATE MUSEUM

H. H. BRIMLEY

Under the financial conditions prevailing it has, of course, been necessary for us to curtail our activities and to refrain from branching out in any new lines of effort. But there is always an abundance of work directly ahead in caring for what we already have, in a museum the size of ours. In many lines museum specimens are not permanent and there is always a steady demand for replacement, repair and renovation.

Owing to the depression in all lines of business that has enveloped all of us during the period under discussion, the attendance of visitors at the Museum has not quite kept up to that reported for the previous biennium, though the decrease has not been as great as one might have expected. The falling off is due, mainly, to the smaller number of automobiles in use on the country roads. I feel that we have done well in attracting the number of visitors that we have. For the two years the visitors to the Museum reached a total of 380,000.

The routine and office work of the Museum has been carried on satisfactorily, and our records show that the acquisition of new specimens is well up to the average of former years, with a greater percentage of specimens of unusual interest. A list of our more notable acquisitions will be presented later on in this report.

Only one habitat group has been prepared during the period, this consisting of a harbor seal taken in lower Neuse River about 1884, and a second specimen secured at Ocracoke in 1931, on a sea-beach groundwork. This species is extremely rare on our coast, being a straggler from much farther north. This group is awaiting facilities for securing a painted background before being placed on exhibition.

The start of the Museum's arrangement with the local chapter of the Junior League, by which the League is to supply guide and instruction service to school classes visiting the Museum, took place during the period under discussion and I may say that it is now progressing favorably. I feel that much good may result from the arrangement.

As a matter of record, I mention the fact that negotiations with the State Highway and Public Works Commission, looking to the acquisition by the Museum of an old-time wooden

cottonscrew press and some other old agricultural machinery, originated with you during the biennium, but that certain financial considerations have so far stood in the way of their consummation.

Miss Kate Ballard's part-time services as stenographer and cataloguer have constituted a valuable help to the Museum force, and I trust that this arrangement may be continued.

Apart from his work as Curator of Geology and associating with the Director in all lines of work in the Museum, Mr. Harry T. Davis has for several years past been assigned by you to take charge of the Department's exhibit at the State Fair, which work, as it seems to me, has been well conducted.

I might say here that Mr. Davis' investigations of the meteoric falls that have occurred in North Carolina have been of particular value.

The following list includes the more valuable and striking accessions that have come to the Museum during the biennium, together with the donors of most of the items:

A twenty-pound amberjack from the Cape Lookout region, caught by J. D. Sargent of Mount Airy, and secured for the Museum by the courtesy of Miss Julia Farmer of Raleigh. A new species for the Museum.

Four specimens of very small tarpon, by Philip Mayer of New York; flying fish, by Alfred Williams, Jr., Raleigh; lizard fish; several specimens of the so-called "joint snake"; lizard, with two tails, Dr. Charles Dearing, Willard; chameleon, S. E. Murry, Middlesex; banded rattlesnake, M. M. Riley, Raleigh; cotton-mouth moccasin, Wilson Legget, Washington, N. C.; two water dogs, Henry Gupton, Raleigh; coral snake, Mrs. J. P. McNair, White Lake; a 300-pound loggerhead turtle; about a dozen freshly hatched loggerhead turtles, A. D. Hurst, Raleigh; Holboell's grebe, J. F. Hatch, Raleigh; several species of water birds from New River Inlet, T. G. Samworth, Marines; red phalarope, W. N. Henderson, Onslow County; broad-winged hawk, Jack Taylor, Jr., Raleigh; Chinese quail, Dr. J. Y. Joyner; Brewer's blackbird, T. D. Burleigh, Asheville; two guinea crosses with either domestic chicken or turkey; barn owl, Albert Straughn, Pittsboro; several species of seabirds collected by Miss Roxie Collie, at Beaufort; two turkey vultures, young birds in the downy state of plumage; a female water turkey, the first ever received by the Museum; ring-billed gull, killed by an automobile in Wake County; two specimens dovkie, Dr. Ben Royal, Morehead City; razor-billed auk, T. G. Samworth, Marines; pomarine jaeger, Theo. Empie, Wilmington, the first of this species ever recorded from North Carolina; greater snow goose, Dr. Ben Royal, Morehead City; hoary bat, R. O. Page, Orrum; wild cat, killed by bus, Joe Barber, Raleigh; a fawn less than 24 hours old, Dr. Charles Dearing, Willard; flying squirrel; Brewer's mole; photographs and measurements for reproducing life-size model of the tail of a 40-foot whale shark, the tail measuring ten feet across, secured through the courtesy of R. C. Fergus, Wilmington.

We have also received also received a number of Indian relics from various sources: a drawing of the Confederate Ram, "Albemarle," a piece of timber of the ways on which the ram was built, and a photograph of Captain Peter E. Smith, who designed the vessel, from Burton H. Smith, Charlotte; several freak specimens of various woods, and the following objects found in bunches of bananas: tree-climbing crab, two murine opossums, adults, but about the size of a house mouse; tarantulas, and other species of spider.

Mr. Davis reports the following in the way of noticeable acquisitions in Geology: Minerals for identification and valuation continue to come in, and have been handled at about the rate of one for every working day.

Collection of mineral specimens has not been material for the last two years, because such specimens of value entail field work. Field work has been done, but at individual expense; hence, of small amount.

Numerous specimens of good exhibit value have been received from citizen friends of the Museum. Notable are:

Fossil shark teeth from Neuse River bed.

Petrified stumps from Deep and Dan River areas.

Pleistocene fossil shells from Hyde County, by A. L. Midyette, Fairfield, N. C.

Large Indian pipe from Four Oaks, by W. V. Massengill.

Four new meteorites from North Carolina, coöperating with U. S. National Museum for technical work on these, and prospective publication, which will be the most valuable contribution made to the geological literature of the state for several years.

Miss Roxie Collie, who graduated from Meredith College in 1932, has been working for the Museum without compensation for the greater part of the time since her graduation. Miss Collie is doing this for the experience she is getting, with the expectation of taking up museum work as her vocation.

Taking everything into consideration, I feel that the Museum is doing better than holding its own. We cannot afford to go backward and it is our intent to keep on moving ahead during the present biennium, hoping that our progress will be greater than in that just past, and in so doing, be of greater service to the public. With a full appreciation of the active interest you continue to take in the Museum as you have always done in the past, this report is respectfully submitted.

VETERINARY DIVISION

DR. WM. MOORE

TICK ERADICATION

Frequent and widespread inspection of cattle for the presence of the cattle fever tick, has been made, especially in the Eastern part of the State where the quarantine has been removed during the past few years. I am very glad to report that no cattle fever ticks have been found and we note a great reduction in all varieties of ticks and a very notable improvement in the cattle both as to type and condition. No cattle fever ticks have been found in this State since early in 1931 and we have every reason to believe that this pest is completely eradicated. It is interesting to note that many thousands of cattle from the drought area of the west and middle west were shipped in by the Relief Administration and pastured the summer of 1934, in a large territory of this State that a few years ago was tick infested. Without tick eradication this would have been impossible.

We have received splendid coöperation from the U. S. Bureau of Animal Industry on this work.

ANIMAL TUBERCULOSIS ERADICATION

Only a very small amount of tuberculosis has been found. In 1928, we completed the testing of all cattle in the State. All reactors were slaughtered and the infected herds were re-tested until all diseased animals were removed. Since the completion of this work we have confined our efforts to the testing of State-owned herds (22), herds owned by charitable institutions, herds to which cattle from outside the State have been added, previously infected herds and certain herds in counties in which the three-year accreditation period has expired.

Numerous requests for testing are received which we are not able to take care of. This is a purely personal service and in many instances the cost of testing would be greater than the value of animals tested. Such testing can be done by local veterinarians at much less cost than the expense to us.

Very satisfactory coöperation with the U. S. Bureau of Animal Industry has been maintained. I wish to mention the fact that North Carolina was the first state to complete the testing of all cattle in the United States. This has since been done by thirteen other states.

Johne's Disease, or paratuberculosis, has been found in six herds. All of these herds recently passed a second negative test and were released from quarantine. This is a chronic, wasting disease, the principal lesions being found in the intestines. The organism causing this disease resembles somewhat the organism causing tuberculosis. A diagnostic test for detecting this disease has been perfected, but it is not so satisfactory as the tuberculin test for tuberculosis. By the continued use of this test and the practice of strict sanitation, the disease may be eliminated.

HOG CHOLERA

No very serious outbreaks of cholera have been reported, though the disease has been prevalent in some sections. In general the disease has not been as prevalent as in some other periods. Outbreaks have been especially light in 1934. The promiscuous use of virus, the purchase of new animals and the feeding of infected garbage or table scraps continue to be the chief cause of the spread of this disease. The work of controlling cholera by quarantine, sanitation and the use of serum alone, and the control of internal parasites by sanitation started in January, 1929, in Beaufort and Hyde Counties and extended to Washington and Tyrrell Counties at the request of the County Commissioners and farmers of these counties, has been continued with success.

Cholera has been very satisfactorily controlled in this area, the few outbreaks occurring being confined to the original premises. All reports of sick hogs are investigated and proper remedies for the correction of the trouble are recommended.

The inspector located in this area, when not engaged in investigating reports of diseases in swine, visits farmers, for the purpose of putting into effect methods of preventing worm infestation. Fairly good coöperation and results have been obtained from this, but owing to the low price of hogs, farmers are not interested to the extent that they were when hogs were high. The inspector stationed in this territory has made a number of investigations in nearby counties for the purpose of determining the cause of sickness among hogs and to advise proper treatment. Much of this illness was found to be due to causes other than cholera in which use of virus would have resulted in an outbreak of cholera.

We have an abundance of evidence to show that much serum and virus is being needlessly used by untrained men, not only

resulting in a waste of money, but often starting real outbreaks of cholera. Yet, recent sessions of the legislature have by special acts granted permission to individuals, unqualified and untrained, to use serum and virus promiscuously. We can never hope to control cholera so long as this continues. We have demonstrated that cholera can be controlled more satisfactorily in an area by proper veterinary investigation and inspection at much less cost than the cost alone for serum and virus used promiscuously by untrained men.

We have received splendid coöperation from the U. S. Bureau of Animal Industry on this work.

BOVINE INFECTIOUS ABORTION

Coöperation with the Experiment Station on the project for the control and eradication of this disease started in 1927, has been continued with good progress. About 25 herds are included in this project. The most of them are now free from the disease and we hope to have the others free in the near future. There has been an increasing demand for assistance in controlling this disease, which is now recognized as of great importance economically and is becoming important from the public health standpoint. A number of towns and cities have adopted ordinances requiring herds from which raw milk is sold, to be free from abortion.

In May, 1929, a plan was worked out to give the herd owners assistance with this disease by arranging to make tests without charge, the owner to have blood samples drawn by his veterinarian and sent to our laboratory. Many have taken advantage of this and we are working with an increasing number of herds. Suitable certificates are issued on herds found to be free from this disease on two annual tests, fifty-three have been issued to date.

Many other herds are being regularly tested and the campaign to eradicate this disease in the state-owned herds has been continued. Fifteen of these are now accredited and we are working with the remaining seven.

The last Congress enacted a law providing funds for the elimination of Bang's Disease (Abortion) in the several States, through the payment of indemnities for animals slaughtered on account of being affected with this disease. The amount paid not to exceed \$20.00 for grades or \$50.00 for pure breds. The sum \$29,500.00 has been allotted to North Carolina, but to date

(September 1, 1934) we have been unable to take advantage of this appropriation for the reason that every facility of this Division is completely engaged in the testing of the thousands of relief cattle brought into this State by the Emergency Relief Administration, without health certificates, referred to elsewhere in this report. We expect to begin this work just as soon as we have finished with these relief cattle.

PULLORUM DISEASE CONTROL

The season for blood testing poultry flocks for pullorum disease extended from August 15, 1932, to March 15, 1933, the first season, August 25, 1933, to March 20, 1934, the second season covered by this report. The inspectors from the Veterinary Division, blood tested the supply flocks for forty hatcheries in the State during the first period and thirty-nine hatcheries in the second period. The combined capacity of these hatcheries totaled approximately 525,000 eggs exclusive of custom hatching facilities and size of each hatchery ranged from 1,000- to 77,000-egg capacity.

The past two seasons was the third consecutive season in which the rapid, stained antigen, whole blood agglutination method was used as the official test.

A total of 120,224 tests were made on 83,057 birds in 542 flocks the first season and 102,102 tests on 68,098 birds in 385 flocks the second season. There were five major breeds and varieties represented exclusive of a number of miscellaneous breeds and varieties which included ducks, geese, turkeys and guineas. The major breeds and varieties included in the test are listed as follows, according to their rank in number of birds: Barred Rocks, R. I. Reds, White Leghorns, White Rocks and White Wyandottes.

The flocks were rigidly culled for breed and variety markings, health, vigor and egg production at the time the first test was made. The culling was done in the majority of the flocks by the Poultry Extension Specialists of N. C. State College. Of the total number of birds handled first season on the first test 16,973 were culled out and 111,339 of them were culled out and not tested the second season.

Of the 120,224 tests made the first season 4,550 reacted and of 102,102 tests made the second season 3,513 birds were found to be carriers of pullorum disease. These reactors along with

the culls were marked and removed from the flock immediately for slaughter.

As in previous years, a heavier infection was noted in the heavy breeds than was found in the Leghorns. Due to lack of time, only flocks which contained more than one per cent infection of the first test, were retested, hence a greater per cent of infection was shown on the second and third tests than would have been the case otherwise.

The rapid, stained antigen test has given us very satisfactory results. The degree of infection found in the supply flocks of the different hatcheries each year is in direct proportion to the hatcheryman's interest in controlling the disease. With this method of test we have found when it is supported with very strict sanitation on the part of the flock owner and the hatcheryman, pullorum disease can be controlled almost 100 per cent. Without such coöperation on the part of the hatcheryman and flock owner, nothing more can be expected than to just hold the infection down to a little lower per cent.

ANTHRAX

No cases of anthrax have occurred during the period covered by this report. All exposed animals in infected territory are being frequently inspected. An investigation is made of all animals that die in these districts and we hope in this way to control this serious disease.

MISCELLANEOUS

We have had an increasing number of requests to investigate reports of outbreaks of disease. It has not been possible to take care of all of this on account of the greatly increased amount of laboratory and other work and a decrease in travel funds. Many of these requests for assistance are for a purely personal service that could be taken care of at less expense and entirely satisfactory by the local practicing veterinarian. This presents one of the most unpleasant problems with which this Division has to deal. Many livestock owners apparently believe that the State should supply them free and prompt veterinary service for all conditions. This, of course, is impossible and I believe undesirable. We have followed the policy of investigating so far as time and funds will permit, those reports that indicate that a serious contagious disease exists that without our help, might spread and seriously affect the livestock industry,

and when a large number of animals are affected and the cause cannot be determined.

No sheep scab, black leg or glanders have been encountered during the period covered by this report, although we are constantly on the lookout for these diseases. We have continued to look after the health of livestock on the twenty-two state-owned farms and have made considerable effort, with success, to prevent disease among their livestock.

Dr. W. R. Baynes, Assistant Veterinarian, resigned March 15, 1934, to accept a similar position with the Georgia Department of Agriculture, at a greatly increased salary. We were unable to fill this position at the salary allowed, until June 4, 1934, at which time Dr. B. H. Staton, a recent graduate, accepted. On February 15, 1934, Dr. A. L. Hirleman, was transferred to the State of Georgia and Dr. A. A. Husman, succeeded him as Inspector In Charge, U. S. Bureau of Animal Industry.

Since the creation of the State Highway and Public Works Commission they have established more than 80 prison camps throughout the State, in addition to the prison farms already existing. Practically all of these camps have more or less farm land attached and on nearly all of them hogs are produced. Since all of these camps feed garbage from the prison kitchens, which is a prolific source of hog cholera, we believe that it is essential that these hogs be immunized against cholera. We have, therefore, undertaken a systematic plan of vaccinating all of the hogs at these camps and all of the pigs that are farrowed. During the period covered by this report we have made one or more visits to all of these camps for the purpose of vaccinating hogs and pigs. Most of these trips were made in connection with other work which we were doing in the vicinity of the camps.

SHIPMENTS OF RELIEF CATTLE FROM THE DROUGHT AREA OF THE WEST AND MIDDLE WEST BY THE EMERGENCY RELIEF ADMINISTRATION

About the middle of June, 1934, we were advised by the Emergency Relief Administration that they wished to ship from the drought area of the west and middle west, a large number of cattle to be pastured, fed and finally slaughtered for relief purposes. They further advised that these animals would be tested and inspected and a certificate issued to cover by the U. S. Bureau of Animal Industry. In a few days we were advised by the E R A that the Bureau of Animal Industry

would be unable to test and inspect these cattle and asked that we waive the laws and regulations requiring the testing and inspecting of these cattle. After going into this matter very thoroughly with the Commissioner of Agriculture, discussing it from every angle, we decided that we did not have the right to waive the laws and regulations covering and that these cattle should be tested and inspected before coming into the state. While we were in sympathy with the unfortunate folks of the state who needed beef and the drought stricken farmers of the west, we were immensely interested in the 200,000 or more cattle owners in this state who through taxation and their moral support had made it possible to eradicate many destructive animal diseases and who looked to us to protect their interest and this enormous investment. We are mindful of the progress made by North Carolina in the eradication of destructive animal diseases, this being the first state to completely eradicate tuberculosis from its cattle and one of the first to eliminate the destructive cattle tick.

In view of our decision the matter was referred to the Attorney General who issued an opinion in the form of a letter addressed to the Commissioner of Agriculture as follows:

Raleigh, N. C.,
July 2, 1934.

SUBJECT: Animal Industry: Emergency Importation of Cattle.

HON. W. A. GRAHAM,
Commissioner of Agriculture,
Raleigh, N. C.

DEAR MR. GRAHAM:

Through Mrs. Thomas O'Berry, the announcement has been made that the United States Government is prepared to ship into North Carolina, from the drought affected territory of the Middle West, from 50,000 to 75,000 head of beef cattle, to be finally slaughtered, prepared, and distributed for relief, under the direction of the Welfare Department. I understand also that the United States Government will bear all the expense of shipping the cattle, caring for them here, and the preparation and final distribution of the product in relief work; and will, if permitted to do so, bear the expenses of tuberculin tests, and such other tests as may be necessary to insure the health of the cattle.

C. S. 4895 (j) provides as follows:

"Whenever a county board shall coöperate with the state and federal governments, whether with or without an election, no cattle except for immediate slaughter shall be brought into the county unless accompanied by a tuberculin test chart and health certificate issued by a qualified veterinarian."

Under the power to make rules and regulations covering the subject, the State Board of Agriculture has adopted a regulation which is substantially the statute in force, as follows:

**"AMENDMENT TO SECTION 4, REGULATION 4, LIVESTOCK
SANITARY LAWS AND REGULATIONS OF JULY 6, 1923,
ADOPTED BY THE BOARD OF AGRICULTURE, JULY 2,
1930.**

"Amend Section 4, regulation 4, Livestock Sanitary Laws and Regulations so as to read as follows:

"Sec. 4. All cattle except for immediate slaughter transported, or otherwise brought into this State, must be accompanied by a satisfactory certificate of health and tuberculin test chart issued by a qualified veterinarian who has been approved by the Chief of the U. S. Bureau of Animal Industry and the State Veterinarian of the State of origin. Tuberculin tests shall be applied in accordance with the regulations of the U. S. Department of Agriculture covering inter-state shipments of cattle. If cattle are shipped, a copy of the tuberculin test chart and health certificate must be attached to the waybill and accompany shipment to destination. If the cattle are not shipped, a copy of the tuberculin test chart and health certificate must accompany the cattle, to destination. No certificate shall be considered satisfactory unless the animals are properly identified on same. Adopted."

On account of the emergency existing in the drought stricken area, and the necessity for the immediate removal of cattle therefrom, on account of the scarcity of water and grass, it will be impossible to apply the tuberculin tests before shipment, and in the states of origin. The only alternative, if the State sees fit to accept the offer of the United States Government, is to permit the shipment of the cattle into the State of North Carolina, maintain them there under quarantine, and apply the tuberculin tests here, destroying such cattle as are found to be unhealthy and liable to produce infection.

The language of the statute and of the regulation above referred to, will be noted: "*all cattle except for immediate slaughter.*"

Obviously, it will be practically impossible to slaughter 50,000 or 75,000 head of cattle either immediately upon their arrival, or within the ten-day period provided by the Federal regulations. In fact, it is clear that the cattle shipped from these territories will be in no condition for slaughter at the time, but must be kept on pastures and provided for until they shall be in condition for slaughter. This will take a considerable period of time, and the question here arises as to whether this should be considered as intended for "immediate slaughter."

In fact, a situation has arisen here which was not contemplated in the law. The section we have quoted, I think, was intended to be made applicable to the ordinary commerce in, and transportation of, cattle.

The purpose of the statute and of the regulation, of course, was to protect the cattle already in the State from infection. It is my understanding that the State of North Carolina has built up a high standard in this respect; and efficient methods provided by the Agricultural Depart-

ment, and a wise administration, has been efficient in producing results that ought to be respected and sustained. On the other hand, an emergency exists by reason of which relief might be given to two great sections of the country, and existing necessities met in both territories in a very practical and common sense way, if the proposed transportation of the cattle can be done under the law.

Referring again to the purpose of the law, which is to protect the cattle of the State from infection, or the communication of disease to them, it seems to me that we may take a practical view of the law which would not deprive the act of its efficiency and defeat its purpose. I think a construction of the law whereby the State of North Carolina might itself carry out the necessary inspection immediately upon the shipment of the cattle into the State, is permissible, inasmuch as we are considering a situation of emergency where the inspection at the point of origin is impossible, the expense to be borne by the Federal Government, as suggested.

Yours very truly,

DENNIS G. BRUMMITT, *Attorney General*,

By: (Signed) A. A. F. SEAWELL, *Asst. Attorney General*.

As a result of this letter special quarantine pens were constructed by the E R A at Raleigh, Goldsboro, Monroe, Asheville, Clyde and West Jefferson, to which points these cattle are shipped for inspection, testing and treatment of sick animals. To date (August 27, 1934) there has been received at these pens more than 60,000 cattle. We are using every available facility to test these cattle and to remove every diseased animal, yet I realize that this is impossible under the circumstances. We are taking care of this work to the exclusion of all other routine work of the Division, feeling that it is very important that we remove as far as possible every diseased animal.

I am still of the opinion that these cattle should have been tested and inspected before coming into the state as is required by our laws and regulations, but in view of the Attorney General's ruling this was not possible.

We shall use every effort to remove the diseased animals and thus prevent the spread of infection to our cattle, yet I fear that under the circumstances infection may spread that will take much money and time to eradicate. I hope that my fears are unfounded.

TEST FARMS DIVISION

F. E. MILLER

It is the purpose of this report to present the program of work at each of the six Test Farms with brief statements as to results secured during the biennium.

CO-OPERATION

The present experimental program consisting of 145 definite projects is handled in coöperation with the Agricultural Experiment Station at the North Carolina State College of Agriculture and Engineering of the University of North Carolina and with the United States Department of Agriculture. This coöperative arrangement has been very satisfactory. The specialists of the State and Federal institutions, who are looking after the various projects on the Stations, have shown a fine spirit in the work. They have been helpful not only in supervising their experiments, but in the conduct of the work on the farms as a whole. I wish to particularly acknowledge our cordial relations with the Director of the Agricultural Experiment Station at the State College, in carrying forward the coöperative research program.

GENERAL

A report at this time would hardly be complete without some reference to the general depression and its effect on our activities. Without going into details, I wish to say that we have tried to make the best of the situation under reduced budget allowances. While it has been necessary to reduce our experimental program and payrolls, nevertheless, it has been possible to render much service to the farming public, and to make progress on certain lines of work.

Owing to the reduced appropriations it has been impossible to keep up with repairs needed and painting of our buildings, and much of the equipment was badly in need of replacement. The proper drainage of certain areas of land had also been held up owing to lack of funds. With the coöperation of the State Civic Works Administration, the Federal Public Works Administration, and with a special improvement allotment from the Budget Bureau, a program of building repairs, painting, drainage and fencing was carried out during the past winter and spring. We were, therefore, able to make substantial strides forward in protecting our Station property during the latter

part of this biennium. The improvement work has certainly added to the general appearance of our stations.

Definite progress has also been made in bringing the work of the Stations closer to the people of the State. The result is evident from the increasing number of visitors each year, and from the fact that they are coming to the Stations to get information relating to the projects underway.

THE NEW STATE-FEDERAL PIEDMONT STATION

During January 1934, the United States Department of Agriculture launched two new projects: "Cotton Breeding Station" for Piedmont North Carolina, and "Erosion Control Nursery" for Southeastern United States. The Cotton Breeding Station carries a Federal appropriation of \$45,000, and the Erosion Control Nursery, \$70,000.

After looking over the various sites offered, the officials of the Federal Department at Washington decided to locate both projects in connection with our Piedmont Test Farm near Statesville. In order to provide for this expansion, 132 acres of land adjoining our Station were purchased with Federal funds, and plans are underway to erect laboratories, greenhouses, cotton gin, dwellings for Government workers, and other buildings needed to carry on the new program of work. Both of the nursery and cotton plantings have been made and the building program has been started.

The cotton investigations include variety studies and breeding for a high yield and resistance to diseases, drought and other adverse conditions.

The Erosion Control Nursery will have to do with testing all plants suitable for planting to prevent soil erosion. All plants which are found desirable for the purpose will be propagated and arrangements made for distributing them to eroded areas for demonstration plantings. Both of these projects will greatly strengthen our agricultural program in the State, and will place our Piedmont Station to the front as an outstanding station in Southeastern United States.

Plans for handling this cooperative work are covered in a formal Memorandum of Understanding between the North Carolina Department of Agriculture, The State College Experiment Station, and the Bureau of Plant Industry of the United States Department of Agriculture.

The following gives the program of work at the Different Stations with brief statements as to results secured.

TOBACCO STATION—OXFORD, N. C.

E. G. Moss

Station Established in 1912

Area of Station, 250 Acres Soil Type, Durham Sandy Loam
Elevation, 500 feet above sea level

Climatological data for 1933

Mean Annual Temperature, 61.2 degrees Fahrenheit
Annual Rainfall, 35.54 inches Total Snowfall, 6 inches

All tobacco research work is in coöperation with the office of Tobacco Investigations, Bureau of Plant Industry, United States Department of Agriculture. The livestock, corn, small grains, cattle and other projects are conducted in coöperation with the North Carolina Experiment Station.

The seasons of 1933 and 1934, have been much more favorable than the previous three or four seasons. The tobacco crop, especially has been normal in quality and yield. Tobacco diseases have been less severe on the Station than for the past three years or four years although certain of these diseases especially the fungus and bacterial diseases have been rapidly increasing in the State. The Granville wilt has not only been increasing in the locality in which it first appeared, but it has been gradually spreading to other parts of the State. It has been reported in a number of the Eastern counties also in a few of the Piedmont counties of the Middle and Old belt areas. Root-knot in tobacco has shown a rapid increase and it is becoming quite serious in the major tobacco producing areas. Other tobacco diseases, notably, Southern-root and Stem-rot (*Sclerotium Rolfsii*), sore shank (*Rhizoctonia*) black root rot, (*Thielvvia*), and black shank (*Phytophthra*) have all shown some increase during the past two years. It has been impossible to do very much work on any of these disease problems on account of the limited personnel and financial support.

The major agronomic projects have been continued and some work on few of the most serious disease problems has been carried out. Below is a list of these projects with a brief statement as to results secured:

Black Root Rot: Two very satisfactory selections of flue-cured tobacco have been made that are highly resistant to this

disease, namely: Paris Wrapper and Jamaica. Both of these varieties are highly satisfactory for the flue-cured type. In addition to these selections there has been another selection of the broad leaf type which appears to be almost immune to this root disease. This variety has not been named as it is being tested out more fully as to quality and yield. The indications are that it is especially adapted and entirely suitable to the sections of the State where root rot is prevalent. A limited amount of seed of these three varieties will be available for the 1935 crop.

Black Shank Tests: Work on this disease, which is regarded as one of the most serious of all of the tobacco root diseases, is being continued on the farm of Mr. T. M. Lewis in Forsyth County. Selection No. 301 has shown to be practically 100 per cent resistant. This selection, which looks good in the field and makes a vigorous growth, has been crossed on several of the more desirable selections of the flue-cured type. The hybrids are being tested and show considerable resistance with im-



FIELD OF TOBACCO IN FORSYTH COUNTY. ALL TOBACCO DEAD FROM BLACK SHANK (*Phytophthora*).

proved quality. This work on this disease has been carried on very carefully and pushed with all speed practical. No seed for this selection has yet been distributed to the growers, but it is hoped to have some of a desirable type within the next two or three years.

Blue Mold Tests: Following the very serious outbreak of the blue-mold (Downy Mildew) in 1932, from which the tobacco crop was reduced approximately 50 per cent, work on this fungus disease has continued and has been pushed with all the speed possible. A large number of sprays have been used during the past two years discarding each time the one that showed the least promise of being beneficial. Some of the cooper sprays seem to afford some protection from the early attacks without seriously retarding the growth of the plant; however results from these sprays were not sufficiently encouraging to be generally recommended. At present the heat controlled beds,



SAME FIELD IN FORSYTH COUNTY. ON LEFT, VARIETY 301 RESISTANT TO BLACK SHANK. ON RIGHT VARIETY, GOLD LEAF, ALL DEAD.

especially those covered with glass, show most promising results.

Tests with Calcium, Magnesium, Sulphur and Chlorine for Tobacco: These tests are being continued on new land. Up to the present time none of these elements are deficient enough in the soil on this particular plot of ground to be able to produce any marked results on the quality and yield of tobacco. However on soils that have been cultivated a number of years the deficiencies of the minor elements are quite marked, which indicates the necessity of supplying such elements in quantities necessary for the proper growth and maturity of the plant.

Special Tests for Leaf Spot Diseases: A series of plats have been started for the purpose of studying the effects of heavy and light fertilization, high and low topping, and on plants that have not been topped. This tobacco is also being studied from a chemical standpoint as to the amount of nicotine resulting from such treatment. Sufficient data for making any definite statements are not available.

Fractional Application of Fertilizer: This series of plats was begun in 1931, to determine the effect of fractional applications of fertilizer on the quality and yield of tobacco. The data so far secured indicates that a split application of the regular fertilizer mixture gives better results than increased applications of some quick acting nitrogenous material or a combination of nitrates and potash. Wherever a second application of fertilizer is applied, it is recommended that this be made within about twenty days after the tobacco is transplanted. On light sandy soils such a practice is recommended.

General Fertilizer Tests: These were started in 1911, and are carried on in three separate fields. The following rotation is being used now:

1st year—Tobacco—oats.

2nd year—Oats followed by Laredo soybeans turned under—wheat.

3rd year—Wheat—fallow.

By following such a cropping system all root diseases have been avoided. On this series of plats wherever one of the principal elements have been left out the deficiency has been slightly accentuated from year to year. Cottonseed meal as an individual source of nitrogen is still at the top. A mixture of cottonseed meal, dried blood, nitrate soda, and sulphate ammonia gives better results than any of the individual sources.

Tobacco After Soybeans: For years we have been trying to grow tobacco after cowpeas or soybeans depending entirely on these legumes for their nitrogen supply. Tobacco of fair quality and yield was secured, but we were never able to grow tobacco of as high quality as that secured by some other cropping system. Beginning in 1933, the sulphur in the fertilizer mixture was eliminated under some of the plats in this field, also some nitrogen was added in the form of nitrate of potash on a part of the plats. On plats where this was done the tobacco was improved both in yield and quality. No definite statement can yet be made, but the indications are that where heavy applications of superphosphate and sulphate of potash have been added to supply the phosphoric acid and potash that excessive amounts of sulphur have been injurious to the cured tobacco.

Nitrogen Tests for Tobacco: A number of sources of nitrogen have been tested out during the past few years at the rate of 20 and 40 pounds respectively per acre with 64 pounds of phosphoric acid from superphosphate and 80 pounds of potash from sulphate of potash. In the inorganic sources ammonium nitrate, nitrate soda, sulphate ammonia, and urea have all given good results. There is some difference in value and yield, but not enough to say that one far exceeded the other of these four. Cotton seed meal of the organic group was probably the outstanding one of the sources tested. Ammonium nitrate as such was difficult to mix on account of it being so hygroscopic in nature.

Plant Nutrition Investigations: These plats consist of tobacco, cotton, and corn planted after hairy vetch, crimson clover, weeds, cowpeas, soybeans, and lespedeza. Tobacco has invariably given best results after weeds. The cotton and corn have given best results after the legumes. Vetch and crimson clover appear to be the best legumes of this group to precede these two crops, but appear to be the poorest to precede a crop of tobacco. These tests have been running for several years, but 1934 is the first year that the crops have been planted after lespedeza. One difference observed after Lespedeza was the slowness of the dried plant to decompose. The fertilizer used under these crops was 1,000 pounds per acre of 1.3-10-10 (NPK). Beginning with the 1934 crop, phosphoric acid was derived from Bicalcic phosphate and nitrogen from Nitrate Potash, the potash from nitrate potash and muriate of potash. By using these materials all the sulphur was eliminated in the fertilizer mixture. From

field observations the 1934 tobacco was the best we have ever grown on these plats.

Placement Tests: Beginning with 1933, a series of fertilizer placement tests under tobacco was started. This project was carried on in coöperation with the Bureau of Agricultural Engineering of the U. S. Department of Agriculture. A machine has been designed for the purpose of placing fertilizer certain distances on each side of the plant, and at certain depths relative to the roots of the plant. Several placements of fertilizer were made using 1,000 pounds per acre of a 3-8-6 mixture and 500 pounds per acre of a 6-16-12 mixture. The object of this experiment is to determine if just as good results can be obtained by using a smaller application of fertilizer provided it is placed at certain distances in relation to the plant. No very definite results have been secured up to the present.

Special Tests: Some tests were begun in 1934, consisting of ten plats testing the nitrate nitrogen against the ammonia nitrogen and the combination of the two. No data has been secured on the results.

Tests with Potash, Sulphur and Chlorine: In 1933, a series of plats were started using potash from different sources, but in every plat the potash and chlorine were kept constant. The only variable was the sulphur. No marked differences were observed by the use of different sources of potash when the total chlorine content and potash were the same. There were some differences where the sulphur varied to any appreciable extent.

A supplementary set of tests were started the same year on which the sulphur was kept constant. The total of these plats consisted of 42 $\frac{1}{20}$ -acre plats. Differences have been observed in the field, also in the yield and value, but we are not yet prepared to make definite statements regarding such treatments.

Special Potash Tests with Cotton: These tests were begun in 1932, using the same plats on which the tobacco had been planted from 1915-1931 inclusive, on which no sulphur had been used except in the sulphate potash plats. We are not attempting to make any report on cotton, but merely submitting this as an indication. The phosphoric acid was derived from precipitated bone, and the nitrogen from dried blood in which there was a little sulphur. The results secured from the two years' tests

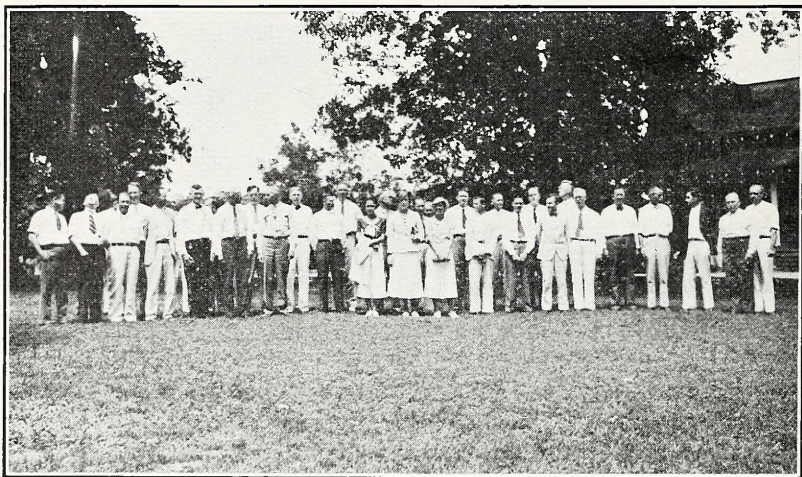


FERTILIZER PLACEMENT TESTS. PLACING FERTILIZER AND TRANSPLANTING TOBACCO AT ONE OPERATION.

would indicate that a fairly liberal supply of sulphur is essential for the best results with cotton.

In 1934, this series of plats was planted to tobacco for a special sulphur test. Sufficient data are not available to make any report.

Tobacco Variety Tests: In addition to White Stem, Oronoco, Cash, Bonanza and Jamaica as the four leading varieties for the flue-cured district, Virginia Bright Leaf has been selected for certification. These selections have consistently produced the best tobacco of all of the selections which have been tested. It is, therefore, recommended that one of these varieties be used. The White Stem Oronoco and Virginia Bright Leaf seem to be better adapted for the sandy soils, the Cash, Bonanza and Jamaica for the heavier soils, except in cases where black-root rot is present. On soils infested with this root disease selections of Paris Wrapper, and Jamaica are recommended.



GROUP OF AGRONOMISTS AND PATHOLOGISTS FROM THE TOBACCO GROWING STATES AND THE U. S. DEPARTMENT OF AGRICULTURE ATTENDING A THREE-DAY MEETING AT THE TOBACCO EXPERIMENT STATION ON AUGUST 8-9-10, 1934, OXFORD, N. C.

Tobacco Seed Beds: A small number of preliminary fertilizer tests were made during the last season on tobacco seed beds. The indications from one year's results are that all of the nitrogen for tobacco beds should not be secured from one source. Where nitrate soda alone was used as a source of nitrogen, the plants turned yellow and failed to grow. They were poorer

than where sulphate of ammonia was used. The best plants were secured in the limited tests that were made from soda and cotton seed meal. This, however, does not mean other sources of nitrogen are unsuitable, but does indicate the nitrogen should be derived from more than one source, at least half of it coming from some of the organic sources of animal or vegetable origin. The chlorine should be kept at a minimum in all plant bed fertilizers.

Plats testing the different sources of potash with dolomite and calcite quantitative magnesium and tobacco mosaic have been discontinued.

Special Tobacco Studies: During the summer of 1933 and 1934 work has been continued with the office of Tobacco Investigations, U. S. Department of Agriculture, under the supervision of Dr. C. W. Bacon, collecting samples of green and cured tobaccos for chemical studies.

In addition to this, some special work has been carried on in coöperation with Duke University, making studies of the chemical composition of tobaccos from the different fertilizer treatments.

Small Grain: The selection of purple straw wheat continues to give good results, and in coöperation with the North Carolina Crop Improvement Association at the State College this seed has been harvested and sold as certified wheat during the past four years.

Corn Selections: Weekley's Improved Prolific corn, which has proved to be one of the best varieties for the piedmont area, is grown on the Station. Field selections are made each year, and all surplus seed has been sold to growers in this area.

Sheep: A small flock of Shropshire sheep are kept at this Station. The best young rams are being sold to farmers for breeding purposes.

Registered Jersey Bull: This bull is kept for the purpose of improving the stock in the community. Approximately 30 to 40 cows are bred to him each year.

Swine: This project is to determine the cost and returns from a small farm herd of hogs and to furnish Berkshire breeding stock to farmers in the community.

Improvements: No improvements have been made during the past two years on account of the limited finances. Three buildings were painted this spring under the C W A project and

others were left unpainted owing to C W A curtailments. The paint for this work was furnished by the State Department of Agriculture.

The tobacco farmers of North Carolina continue to visit the Station in increasing numbers. The 1933 and 1934 Annual Field Day meetings were well attended. In addition two Field Day meetings for the Negro farmers were held. Approximately 300 negroes attended the meeting in 1933 and about 500 in 1934. The programs at these meetings have been well received and were largely of an educational nature.

On August 8th-9th-10th, 1934, the Research Agronomy Committee of the four bright flue-cured tobacco producing states and plant pathologists of the entire tobacco belt met at the Tobacco Station for a joint conference on tobacco problems. There were between forty and fifty specialists present. Representatives were present from as far west as Wisconsin and as far north as Connecticut. Japan was the only foreign country represented at the meeting.

COASTAL PLAIN STATION, WILLARD, N. C.

CHAS. DEARING

Station Established in 1905

Area of Station, 293 Acres Soil Type, Norfolk Fine Sandy Loam
Elevation, 51 feet above sea level

Climatological data for 1933

Mean Annual Temperature, 64.7 degrees Fahrenheit
Annual Rainfall, 44.5 inches Total Snowfall, less than 1 inch

During this biennial period the Coastal Plain Station, like other departments and business activities, has faced some very puzzling situations owing to reduced budget allowances. Only our coöperative relations with the U. S. Department of Agriculture has enabled us to hold working forces in tact. No effort has been made to add new State projects as these could not be financed, but we have by close application avoided curtailing the program of work further and feel that we are now in a position to begin a new program of increasing activity in the interest of agriculture in the Southeastern part of the State.

The following is a summary of work underway at the Coastal Plain Station with brief statements as to object and results achieved during the biennium.

AGRONOMY

Soil Fertility Investigations: In coöperation with the other test farms and the State Experiment Station a field is maintained for the study of fertilizers in relation to the soil types of North Carolina. These tests have run now for over twenty years, and the results are becoming more significant accordingly. While the use of excess applications of fertilizer have been shown to be unprofitable on this type of soil, the need of a general fertilizer and the importance of using leguminous crops has been emphasized. No fertilizer by itself has proven sufficient. The combination of nitrogen, phosphorus and potash along with sufficient lime to keep the soil from being too acid has proven most successful. Excess applications of lime have been disastrous in that they have rendered certain elements insoluble. This results in a yellowing or chlorosis of plant tissue and plots so affected have made less growth. Excess applications of lime in the absence of other fertilizers has been more disastrous than the failure to use any kind of fertilizer.

Corn Variety Test: This test has been running now for a sufficient number of years to permit us to get, after this season's results, a definite reading over a period of five years which should give very significant results as to the adaptability of leading varieties of corn to the southeastern part of the State. Outstanding varieties in these tests have been Cocke's Prolific, of which the Station has developed an improved strain, and Latham's Double. Yellow corn, as well as white corn, is being tested. In general the yellow varieties are earlier in maturing than the white, but the yields have not been so heavy. Golden Dent, Jarvis and Indian Chief have been the leading yellow varieties in different years. The outstanding variety for the period will probably be apparent after this year's test.

Corn Selection Work: Since it became necessary for the State Experiment Station to withdraw coöperation on corn selection work the Test Farm has endeavored to maintain this project at least to the extent of field selection for the purpose of maintaining the improved strain of Cocke's Prolific which results from the years of work done here in selecting this variety.

Value of Special Grasses: Tests with various types of grass suitable for lawn purposes are under way. A project has been started to test the practicability of producing rye grass seed of which an increasing quantity is being used in eastern North

Carolina each year. This grass was used first only as a winter lawn grass around the estates of the wealthy people, but more recently has become generally used as a winter lawn grass in the section. Still more recently the value of this grass as a green crop for poultry yards in the winter time has been demonstrated and it is now thought that it is probably one of the best grasses for winter grazing of cattle and is being tested for this purpose at our Station.

FORAGE CROP WORK

Forage investigations are in coöperation with the U. S. Department of Agriculture, this Department maintaining a special worker at the Station as the leader of this project. Various forage crops are under test.

Crotalaria: Experiments have been continued along the same general lines followed in the previous biennium. *C. incana* and *C. lanceolata* have been substituted for *C. striata* as these species have seemed more promising here than the *striata* in variety test work. An early strain of *C. spectabilis* developed at the Sandhill Station, Columbia, S. C., has been substituted for the ordinary commerical strain of *C. spectabilis*. It has been found desirable to plant *crotalaria* in cultivated rows, rather than broadcast on account of the competition of grass and weeds when the plants are first started. Attempts are being made to develop an early strain of *C. intermedia* which has proven more palatable to livestock than other *crotalaria* species. Marked increases in yields have been obtained following the turning under of a crop of *crotalaria*. While *crotalaria* shows much promise as a green manure crop for poor soils, it cannot be considered as competing with soybeans for this purpose on the better soils of this region.

Lespedeza: The experimental work with annual *lespedeza* was discontinued in 1933, the plantings having failed due to grass competition in the two previous years. Pasture tests in 1934, however, showed good crops of annual *lespedeza*. Results obtained from a one-acre plot of perennial *lespedeza*, *Lespedeza sericea*, which was planted in 1932, indicates that at least two cuttings per year of excellent hay can be made, provided the first cutting is made not later than June 1st.

Soybeans: The variety test begun in 1932, was continued in 1933, with 19 standard varieties. In 1934, a promising early type of the Laredo variety was included as was also one of the

most promising of the numbered introductions grown in 1932-1933. About 300 new introductions from foreign countries were grown in short rows in 1933, together with about 75% of the more promising test numbers from the previous season. In the spring of 1934, 99 new introductions were received and are being grown in 10-foot rows together with various plantings of the more promising numbers grown in 1932 and 1933.

Edible Soybeans: Plantings to increase seed stock were made in 1933 with the seed of two green vegetable types (edible varieties) which had been grown in short rows in 1932. In 1934, the seed from these increase plots were used to plant about two acres for the purpose of building up a seed stock of these types. This seed will be distributed by the Coastal Plain Station at moderate cost in order to get these edible types in the hands of interested growers. Seed of about 50 green vegetable (edible) types selected from the introductory block in 1932-1933, are being grown in increase plots, making a total area of about 3 acres now planted to these green vegetable types. This is probably the largest planting of edible soybeans in the United States this season.

The Forage Crops Nursery has been necessarily reduced in extent on account of appropriations. This nursery consists of acid tolerant legumes. About 75 miscellaneous legumes were grown in 1933, and about 60 species were planted in 1934. A perennial species of beggarweed, *M. baniceulata pubens*, is showing much promise as a forage plant.

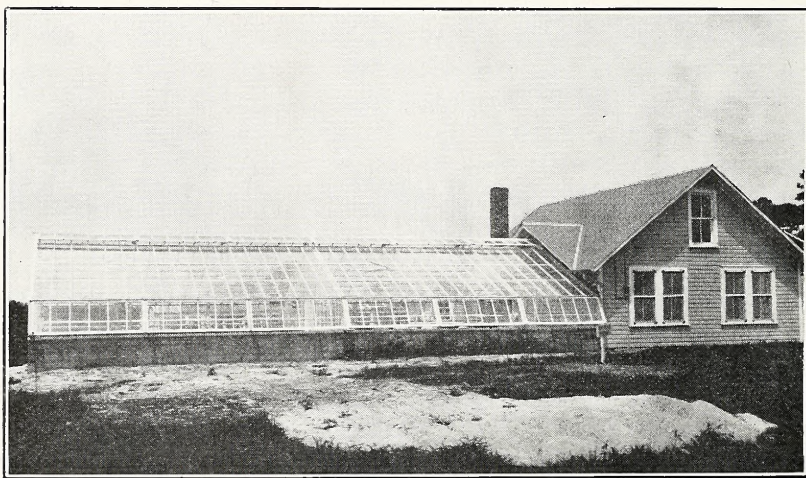
Winter Legumes: Experimental plantings of vetch and winter peas failed in 1932, due to late seeding and unfavorable weather conditions. It was necessary to reduce the extent of the plantings in the fall of 1933, in view of the shortage of funds. The work was limited to a general comparative test in winter peas, crimson clover and a number of species and varieties of vetch. All of the plantings except crimson clover were more or less injured by the cold weather in January and February and the results on the whole were rather unsatisfactory.

DAIRYING

The Station now has a pure-bred Jersey herd, a dairy breed and a pure-bred Red Polled herd, a dual purpose breed. Owing to financial curtailments it was necessary to drastically curtail the Jersey herd, and animals had to be sacrificed in order to get the herd within the budget allowances for feed purposes.



A LESSON IN CO-OPERATION FROM COASTAL PLAIN STATION. SENIOR JERSEY BULL AND JUNIOR RED POLLED BULL WORKING TOGETHER, HAULING MANURE FROM DAIRY BARN FOR THE BENEFIT OF FUTURE CROPS AND IN ORDER TO GET EXERCISE FOR THEMSELVES.



GREENHOUSE AND LABORATORY ERECTED FOR STRAWBERRY RESEARCH AND BREEDING INVESTIGATIONS.

The Pure-bred Jersey Herd: This herd at present consists of 20 animals. With the exception of one junior sire, this herd is made up of the progeny of two of the outstanding Jersey cows bred and developed by the Station's Eminent's Fern Lucile and Eminent's Field Flower (now 13 years old) with gold medal records of the American Jersey Cattle Club of 710 pounds and 716 pounds butterfat respectively. A study of the records of production of the daughters and granddaughters of these two foundation animals is being carried out, and satisfactory progress is noted in the transmitting of the good qualities of these two cows to their offspring.

A Pure-bred Red Polled Cattle Herd: This herd of 35 head has been established under a coöperative agreement with the N. C. Department of Agriculture, the N. C. State College, and the U. S. Department of Agriculture, Bureau of Animal Industry. This herd has been at the Station for approximately a year and a half. Experiments with this herd were started in January, 1933, with the following objectives in mind:

1. To breed Red Polled cattle with maximum efficiency in the production of beef and milk, and measure their performances under North Carolina and Coastal Plain conditions.
2. To use these Red Polled cattle to determine the best permanent and annual pastures, efficient methods of handling such pastures, and the relative value of land used for grazing and for the production of harvested crops for this area.

Approximately 15 acres of land have been fenced and set aside for growing and testing these temporary grazing crops in rotation: i.e., Common and Kobe lespedeza, soybeans, soybeans and Sudan grass for spring and summer, and Abruzzi rye and Italian rye grass for fall and winter. In these studies both mature and immature animals are being used, and much valuable data is being collected.

SWINE INVESTIGATIONS

Swine investigations in coöperation with the State Experiment Station relate to the cost of raising pigs to weaning age, and cost of maintenance and returns from the family sow. Owing to the presence of extensive poultry and dairy operations the Station restricts its swine work. We are endeavoring, however, to maintain a two sow and boar project for the purpose of producing and selling better pigs of good breeding and pedi-

gree as foundation stock for use in the section. Having persisted in this type of work over a period of 15 years, the Station can now see the result of its activities by the uniform better swine in the Southeastern part of the State, and there is a large number of animals in the section at the present time which trace back to the original stock purchased for this project.

SHEEP INVESTIGATIONS

In coöperation with the State Experiment Station a small sheep project has been continued as a demonstration of diversified farming under Eastern Carolina conditions. Trouble with parasitic worms has been experienced, but this has apparently been held under control by systematic drenching.

POULTRY

The Station has an adult poultry flock of 375 Single Comb Rhode Island Reds. This flock is certified to be free of Bacillary White Diarrhea and is accredited by the North Carolina Veterinary Department. Experimental work is in coöperation with the State Experiment Station.

Flock Improvement: One of the principal projects relates to flock improvement; the purpose being to teach and demonstrate the value of a disease free, high egg production, pure-bred flock over the common mixed breed of chickens which used to be generally found in Southeastern North Carolina. Already there is much improvement in the general flocks of the section. The Station is endeavoring to get as many hatching eggs, baby chicks, pullets and cockerels as possible into the hands of farmers and poultry breeders by making these available at the Station at a reasonable price. We are endeavoring to improve the flock by careful and proper feeding, management, culling and breeding along with proper record keeping. By trap nesting and pedigreeing egg production has been increased from 142 eggs per year to as high as 199, and this has been accomplished since this project was started three years ago. Careful culling from the time the chickens are eight weeks old has tended to improve health, vigor and color. The value of using preventive measures to keep the flock healthy, such as deworming and vaccinating, has been demonstrated. A heavy loss can be avoided by doing this in Southeastern North Carolina, and a number of flock owners are following the Station's lead along this line.

Feeding and Management: Tests are being conducted with various supplements. The principal of these are fermented mash, yeast, cod liver oil and milk. One test running for the past two years using yeast and fermented mash produced more than 2,500 more eggs in one year from a pen of 100 hens than the control pen in which these supplemental feeds were not used.

Protein Level Test: This test is for the purpose of developing strong, healthy pullets by using less animal protein than is contained in regular commercial growing mash, thereby holding back egg production on early hatched pullets and avoiding a moult in the early fall which causes a heavy loss in egg production during the winter. This method also saves about \$2.60 per ton on growing mash used to develop the pullets. A bulletin will probably be published very soon on this work.

One of the principal values of the poultry plant here is that it serves as a source of information and guidance for farmers and poultry raisers of the section. During the season a large number of these interested farmers and breeders visit the plant to get information or secure hatching eggs, baby chicks and other poultry. We have had as many as 130 visitors to the poultry plant in one month in addition to other visitors to the Station.

FORESTRY

The Station forests have been maintained including the test of growing timber in thinned managed forests as compared to forests left without any attention. During the winter a considerable amount of work was done using C W A funds to clean up the Station forest lands where trees had been felled by storms and also to prepare a fire lane for the protection of the forest.

HORTICULTURE

Blueberry Investigations: The U. S. Department of Agriculture, having withdrawn its resident worker on this coöperative project, has not progressed much from an investigational standpoint during the period, though approximately two acres of blueberry seedlings have been brought into fruit and tested on the land of one of the commercial blueberry growers and other seedlings have been tested at the Station. Those at the Station are of the type that grows on the high sandy lands of North Florida. While this type of seedling has grown nicely and produced abundant crops, the fruit has come too late to be of commercial value. Seedlings of the native high bush blueberry are

more promising. Growers, especially New Jersey blueberry growers, who have come into North Carolina as a result of the interest stirred up by the Station, have developed extensive commercial plantings which are proving most successful, fruit having been sold at prices ranging from 40¢ to 80¢ per quart, depending on the size of berry, season and scarcity of crop. It appears that this industry offers opportunity for the intelligent grower who can work over a long time period.

Muscadine Grape Investigations: These investigations in coöperation with the U. S. Department of Agriculture have taken more importance since the repeal of the prohibition laws. The Station is serving as a source of information on the culture of Muscadine grapes, and a very pronounced movement of increasing acreage is underway. The fruit in the Station's vineyard has become more profitable owing to the desire for wine interests wanting to purchase all possible fruit in the section. The Station's vineyard is, therefore, not only affording a demonstration, and information to interested parties, but it is becoming a financial asset to the Station.

Bulb Investigations: In coöperation with the U. S. Department of Agriculture this project has been maintained and additional varieties have been put under test. The past winter was exceedingly severe for bulbs and much damage was done in commercial plantings and the Station plantings also suffered. The severe freezing conditions were especially hard on Dutch Iris, but even the hardiest daffodils were damaged to some extent.

Bulb Disease Control: In coöperation with the U. S. Department of Agriculture the study of bulb diseases and the use of various disinfectants in powered and liquid form as agents of control has been carried forward. It has been clearly demonstrated that it is possible with the use of these disinfectants to clean up badly diseased stock and bring it back into good cultural condition. Tests have now been started to study the matter of disease in relation to other crops which are grown in rotation with bulbs and certain isolation plats have been established to study the way in which these soil diseases affecting bulbs are transmitted and the speed at which they are transmitted.

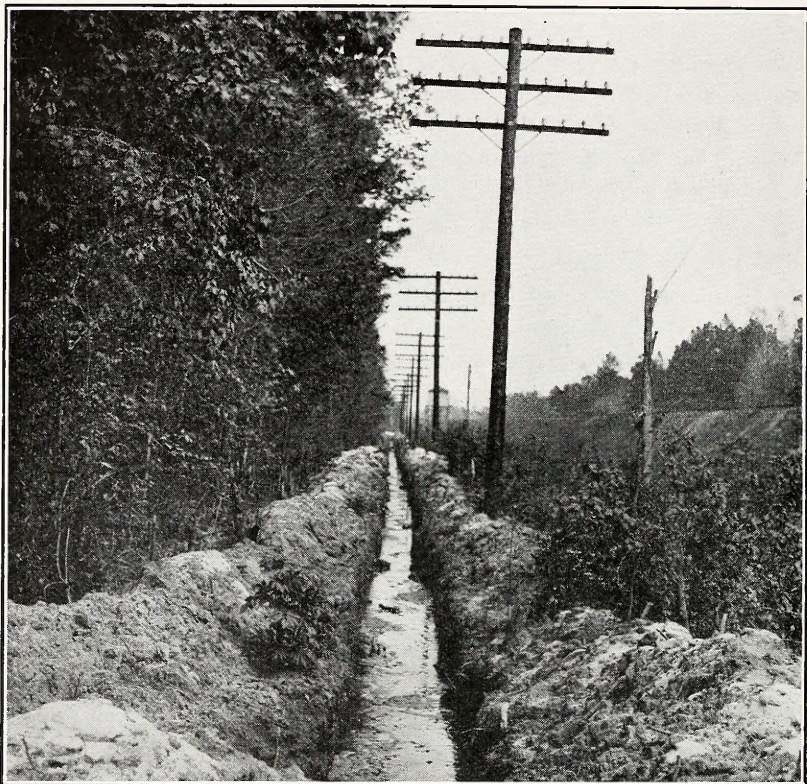
Raspberry Breeding: In coöperation with the U. S. Department of Agriculture this project has been continued. At present a large number of seedlings are being grown and tested and

some of these appear promising. The importance of this work is emphasized when it is pointed out that there is not at the present time a single variety of raspberry known to succeed in the South. In addition to other seedlings a large number of seedlings of the Japanese trailing raspberry introduced recently by the Dorsett-Morse expedition have been planted. These seedlings are crosses between the original introduction and best American varieties.

Strawberry Investigations: In coöperation with the U. S. Department of Agriculture the strawberry investigations continue to expand and to become more important. Thousands of seedlings are being tested annually and some entirely new types, most promising seedlings, are now being multiplied with a view to their introduction. Already from this work the following varieties have been introduced: Blakemore, Bellmar, Southland, Fairfax and Dorsett. Of these varieties the Blakemore has spread generally through the United States and is recognized already as an important commercial variety. The Southland probably is the highest quality home variety adapted to the South. During the past three years the Station has demonstrated the importance of careful handling and packing of fruit by getting top prices on the local auction market daily and establishing a reputation for its standard U. S. No. 1 grade of strawberries. The Station has also been working with various types of crates in the hope of bringing about the use of more attractive containers which will carry fruit to market in better condition and thus give a better reputation to the general fruit crop of the section. Cultural tests have been conducted for the purpose of bringing out the principles underlying the proper culture and spacing of plants. These tests have related particularly to the Blakemore variety which promises to become the leading commercial variety of the section when growers understand its habits and grow it to the best advantage.

IMPROVEMENTS

During the first year of the biennium owing to the scarcity of funds little improvement work could be done, but in the winter of 1933 and 1934, with the aid of the North Carolina Civil Works Administration, it was possible to carry out a very definite improvement program. The N. C. Department of Agriculture furnish materials and the C W A furnished labor for a program which consisted of four projects:



VIEW SHOWING NEW TYPE OF DITCHING AND DRAINAGE, THE USE OF WHICH HAS AIDED CROPS UNDER WET CONDITIONS.

(1) Repairs to Station buildings; (2) Painting Station buildings; (3) Ditching and drainage work; (4) Establishing a fire lane to protect Station woodlands and buildings near same.

Following these four projects two supplementary projects were carried out; one to continue the painting project, and the other to complete the ditching and drainage work.

Through the Office of Forage Crops of the U. S. Department of Agriculture, funds were secured from the Federal C W A for the preparation of twenty acres of land for pasture experiments and the drainage of this area.

The Station has also received appropriations from the Public Works Administration for Federal projects. This has permitted the building of a new laboratory and green house of the latest and approved type, a shade house 60x128 feet, and the installation of an irrigation system covering approximately

fifteen acres of land. All of the P W A work is intended to improve the facilities of the Station for the conduct of the coöperative small fruit investigations and the buildings will be used primarily for activities pertaining to the strawberry research and plant breeding.

PUBLIC RELATIONS

During the biennium the Station has held two Annual Field Days and two Negro Field Days, the Annual Field Days being the most successful ever held here and having the largest attendance. In addition the Station has held in the spring a special strawberry day each year. The strawberry day in the spring of 1934, being especially successful and being attended by the leading strawberry growers of Southeastern North Carolina. Many of these growers expressed the desire that this day be continued each year. There were approximately 500 folks in attendance at the strawberry day in 1934, and at each of the Negro Field Days, whereas the attendance for the Annual Field Day has been approximately 9,000 each year. The Station has been serving in an advisory capacity in relation to the Federal subsistence homestead project located in Pender County within five miles of the Station property, and it is hoped that it may serve as a valued aid in enabling this project to be a success rather than an experiment.



A PORTION OF THE CROWD OF 9,000 VISITORS TO THE ANNUAL FIELD DAY AT THE COASTAL PLAIN STATION.

BLACKLAND STATION—WENONA, N. C.

J. L. REA, JR.

Station Established in 1912

Area of Station, 200 Acres

Soil Types, Peat and Muck

Elevation, 16 feet above sea level

Climatological data for 1933

Mean Annual Temperature, 61.6 degrees Fahrenheit

Annual Rainfall, 48.64 inches

Total Snowfall, 5 inches

The blackland region of Eastern North Carolina comprises approximately one million acres. This area is best suited to the growing of feed crops and the production of livestock. The experimental program of work at this Station is planned with the view of developing these agricultural industries.

In addition to the 200 acres of land owned by the Department of Agriculture, the Station is renting eighty acres for the growing of feed for the extensive livestock experiments and 160 acres of reed land adjacent to the Station are used annually for grazing beef cattle.

A list of the projects underway and a brief report of the progress being made is given below.

AGRONOMY

Coöperating with the N. C. Experiment Station

Lime Tests: This experiment was started in 1917, and consists of 21 plats. The lime treatments are applied once every three years in the form of marl, hydrated lime and finely ground limestone at the rate of one, two, three and four tons per acre. The results indicate that lime in any form increases the yield of corn on the blacklands, but finely ground limestone applied at the rate of two tons per acre has given best results. Bulletin No. 292, *Crop Response to Lime and Fertilizer on Muck Soil*, published by the North Carolina Agricultural Experiment Station, gives complete information on the results from this project.

Fertilizer and Crop Rotation Studies: This test is intended primarily to determine the value of fertilizers on muck soils, and also to compare the efficiency of the different sources of phosphate. The rotation used in the experiment is corn, oats and Irish potatoes. The oats and Irish potatoes are followed by soybeans broadcast for soil improvement purposes. The phosphate from different sources has increased to some extent the

yields of oats and potatoes, but does not affect the yield of corn. Potash seems to be the most essential plant food needed.

Cultural Treatments of Corn and Soybeans: The object of the experiment is to determine the best cultural practices in growing corn and soybeans on the blacklands. The different practices compared in the test are deep plowing, disking, ridging and flat cultivation. The results show that flat cultivation except during an extremely wet season is better than ridging, and that disking is as good or better than deep plowing. There is no benefits derived from rolling this muck soil.

Corn and Soybean Soil Fertility Experiment: A rotation of corn and soybeans is used in this experiment which is divided into twenty-six plats. The object of the test is to determine the best fertilizer for corn and soybeans in rotation. One-half of the soybean plats are harvested for seed and the other half for hay. Nitrogen and potash mixtures without phosphoric acid have given the largest yields of corn and soybeans. So far there has been little difference in the average yields of corn following soybeans cut for hay and harvested for seed on muck soils.

Lime Potash Soil Fertility Experiment: This experiment was started in the spring of 1934. The object of the test is to determine:

- (1) If small annual drill applications of finely ground dolomitic limestone are as effective as larger ones made less frequently broadcast at the same rates for any four-year period;
- (2) what amounts of potash are most economical to apply when used alone at different rates with limestone, and when used with nitrogen and phosphoric acid separately and in combination;
- (3) the cause or causes for secular change in crop yields when they are grown on this type of soil during the first few years after the land is cleared and put into cultivation.

Fiber Flax Test: In coöperation with the Office of Fiber Investigations, U. S. Department of Agriculture and the Textile Foundation Institute, this flax test of one acre was started in the spring of 1934, and harvested during July of that year. The yield was approximately two and one-half tons per acre. The flax was shipped to Clemson College, S. C., for further studies as to qualities for spinning, etc.

Manganese and Copper Sulphate Studies: The results indicate that neither of these elements will increase the yield of corn on this soil type. The residual effects of such treatments

are being studied after the plats have received a liberal application of muriate of potash.

Seed Corn Selections: Progress is being made in selecting Highland Horse-tooth and Jarvis Golden varieties of seed corn for resistance to root-rot and for increased yields.

LIVESTOCK INVESTIGATIONS

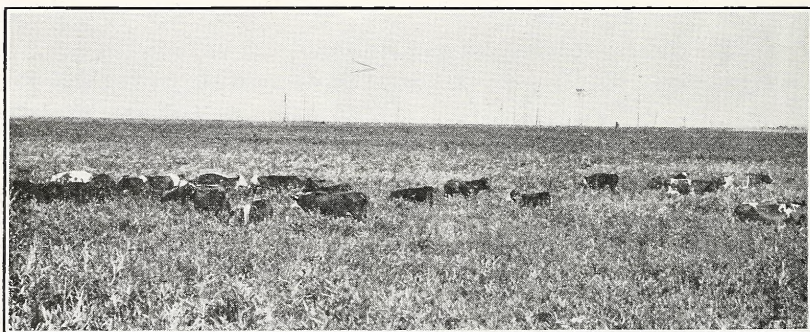
In Coöperation with the N. C. Agricultural Experiment Station and the Bureau of Animal Industry, U. S. Department of Agriculture

Cottonseed Meal for Fattening Pigs: Cottonseed meal was used as a supplement to corn and fish meal for 168 pigs in two feeding trials.

The two groups that were fed a protein mixture of one-third and one-fourth fish meal and two-thirds and three-fourths cottonseed meal did not make as rapid gains as those fed fish meal alone, however, the addition of the cottonseed meal lowered the cost of the ration.

Quality of Meat: During the fattening period grade Hereford calves produced 100 lbs. gain on 69 pounds less corn, 25 less cottonseed meal and 36 pounds less soybean hay than native calves handled and fed in the same way. The grade calves were also valued at 45¢ more per Cwt. when finished and ready for market.

Comparative Gains on Reed Pasture: During a 188-day grazing period grade Hereford calves made an average daily gain of 1.27 pounds while native calves made an average daily gain of 1.13 pounds.



NATIVE REED PASTURE FURNISHES GOOD GRAZING FROM MAY TO JANUARY ON THE BLACKLANDS.

Crop Gleanings for Wintering Beef Cattle: The corn stalks and soybeans (unharvested) from 64.5 acres maintained 31 dry cows for 53 days with an average loss in weight of only 11 pounds per head. The average yield of corn from this area was 26.4 bushels.

Pasture Fertilization: Fertilization of a pasture consisting of blue grass, herds grass, and lespedeza showed advantages in favor of complete fertilizer nitrate and potassium in the order named as compared with the check plot with no fertilizer. Phosphate had an adverse effect on the growth of grasses.

Improvement of the Family Milk Cow by the Use of Pure-Bred Guernsey Sires: This Station has kept a pure-bred Guernsey bull since 1926 for community service. The type and quality of milk cows has been much improved in the Wenona section, as a result of this project.

Work Stock Improvement: There is an urgent need for more and better work stock in North Carolina, and this Station has taken the lead in encouraging the raising of good work stock in Washington and adjoining counties. In the spring of 1934, a pure-bred Percheron stallion and two Percheron mares were purchased by the Station. The stallion is available for community service.

The Farm Flock of Sheep: A flock of twenty ewes and a pure-bred Hampshire ram are included in the Station's live-stock program. Information is secured on the feed costs and returns from wool and lambs. The Station also furnishes breeding stock at reasonable prices to farmers interested in the industry.

CROPS AND LIVESTOCK—1934

- 150 acres planted to corn.
- 75 acres soybean hay.
- 10 acres soybeans for seed.
- 15 acres Agronomy experimental plats.
- 22 acres tame pasture grass.
- 160 acres reed pasture.
- 100 head of beef cattle.
- 12 brood sows and one boar.
- 20 ewes and one ram.
- 6 work horses, 1 stallion, 1 saddle horse.
- 1 Guernsey bull.
- 2 milk cows.

IMPROVEMENTS

During the winter of 1933-34, with labor allowed by the Civil Works Administration and materials furnished by the Department of Agriculture, a program of repairing, painting and remodelling the buildings was undertaken. The roof on one of the dwellings was replaced, gutters, screens and steps to all dwellings were either put up new or repaired. In addition to repairs to the dwellings and barns, the entire drainage system with the exception of the tile drainage, was cleared out and new ditches dug where necessary. The appearance to the Station was materially improved by the painting and other improvements made.

URGENT NEED

The lack of an all-weather road is at this time the greatest need of the Station. The road to the Station is almost impassable during a great part of the winter, and also during the rainy season in the summer. Many visitors are kept away on account of the road. This has been clearly demonstrated at several of our Field Days when half of the cars had to be dragged to the highway by horses and tractors.

PUBLIC RELATIONS

During the past ten years our Annual Field Day has been held either the latter part of July or the first of August. From 750 to 2,500 people have visited the Station annually for this occasion. Much valuable information has been gained on the handling of livestock, soil fertilization, and lime and plant deficiencies that affect our crops. No doubt many more people would have attended these meetings *had the Station been located on a good highway.*

UPPER COASTAL PLAIN STATION—ROCKY MOUNT

ROUTE No. 4

R. E. CURRIN, JR.

Station Established in 1902

Area of Station, 202 acres

Soil Type, Norfolk Sandy Loam

Elevation, 100 feet above sea level

Climatological data for 1933

Mean Annual Temperature, 62.1 degrees Fahrenheit

Annual Rainfall, 34.64 inches

Total Snowfall, 11 inches

This Station is being used more by the farming public each year. There is hardly a day that we do not have visitors seeking information on some phase of agriculture. The County Agent

brings groups of farmers each year to study the work of the Station, and the Vocational Agriculture Teachers bring their classes to obtain instruction in modern agriculture and to look over our experiments.

The program of work with a brief summary of the results secured from each project is reported below.

AGRONOMY

The tobacco experiments are handled in coöperation with the Office of Tobacco Investigations, U. S. Department of Agriculture.

Tobacco Variety Test: Several leading varieties of tobacco have been tested and the Virginia Bright Leaf, Bonanza and Hickory Pryor seem best for this section of the State. Individual plant selections are being made each year from these varieties and several strains have been developed which show improvement over the original variety. Seed are being distributed each year to farmers of the State.

Tobacco Fertilizer and Rotation Test: This test has been reported and is now discontinued.

Split Application of Fertilizer for Tobacco: This series of plats was begun in 1931 to determine the effect of fractional applications of fertilizer on the quality and yield of tobacco. The data so far secured indicates that a split application of the regular fertilizer mixture gives better results than increased applications of some quick-acting nitrogenous material or combination of nitrates and potash. Wherever a second application of fertilizer is applied, it is recommended that this be made within about twenty days after the tobacco is transplanted. On light sandy soils such a practice is recommended.

The following Agronomy Experiments are in coöperation with the N. C. Agricultural Experiment Station.

Rotation Experiment: There are 13 different rotations run in duplicate in this test. The experiment was started in 1924 to study the value of one-, two-, three- and four-year rotations with and without legumes. So far the corn and peanuts have responded most to the rotations. The increase in corn yields due to a three-year rotation where legumes are used has been as much as 20 bushels per acre over the continuous corn plat. In rotations where large amount of legumes have been turned under, cotton shows potash deficiency unless additional potash is added to the normal application.

Source of Nitrogen Study for Cotton: The inorganic sources of nitrogen have given better results than the organic forms for cotton.

Time and Method of Fertilizer Applications for Cotton: This experiment is handled in coöperation with the U. S. Department of Agriculture and the National Fertilizer Association. The object of the test is to determine the effect of the different methods and time of applying fertilizer on the stand, growth and yield of cotton. The fertilizer distributing machine used in this test was designed by the U. S. Bureau of Public Roads. Fertilizer applied to the side of the seed at planting time gave the best results. When the fertilizer was applied below seed considerable damage to germination resulted.

Fertilizer Experiment with Rotation of Corn and Soybeans: This experiment was started in 1926 to determine the best fertilizer for corn, soybeans (for seed), soybeans (for hay), and to show the effect upon the succeeding crop of corn by picking soybeans for seed, remaining parts turned back for soil improvement, versus cutting the soybeans for hay. Corn planted after soybeans are gathered for seed yields from 30% to 50% more than where soybeans are cut for hay. Corn and soybeans both lodge badly where insufficient amounts of potash are applied. Soybeans are very susceptible to fertilizer damage, germinating very poorly where large amounts of fertilizer are applied below seed at planting.

Fertilizer and Dusting Experiments with Peanuts: The object of this experiment is to determine the influence of fertilizer, lime and landplaster upon the yield and quality of peanuts. So far the lime and landplaster has not increased yields. Leaf spot has been more prevalent on the unfertilized areas. A 2-8-4 fertilizer applied at the rate of 400 pounds per acre has given increased yields over the no fertilizer plats. Calcium seems to be the factor most to be considered when using lime or landplaster. Where sufficient calcium is found in the soil applications of lime or landplaster do not increase yield. The general practice of peanut growers has been to apply both lime and landplaster, but results tend to show that if sufficient lime is applied early enough that the landplaster will not increase yields.

An Experiment to Determine the Amount of the Minor Plant Foods Necessary for Growing High Quality Tobacco: This experiment has been carried on for only two years and no definite conclusion can be drawn at this time.

Potash and Lime Experiments with Tobacco: So far the use of lime has not increased the yields of tobacco on this soil type. A mixture of one-half muriate and one-half sulphate of potash substituting sulphate of potash magnesia in place of sulphate where sand-drown is prevalent, is recommended.

Utilization of Crops: The object of this experiment is to compare crop yields, financial returns and fertility of soil under two methods of utilization of crops. A three-year rotation of corn and soybeans, cotton with crimson clover and rye; soybeans followed by crimson clover and rye. By the first method all crops are hogged off, except cotton, while by the second method certain crops are harvested while others are turned under for soil improvement. Where the corn and soybeans are hogged off, the yield of cotton in the rotation is increased some over where the corn and soybeans are harvested.

Cotton Breeding Studies: Breeding work with the Mexican variety has been under way at this Station since about 1917. Line breeding has been practiced during all of this time. The uniformity of plant type and staple length has been greatly increased during these years. Yields have also been increased. New strains which show superiority in yield and quality have been distributed at various times. These strains can all be traced back to plant No. 18, selected in 1917. Pure seed of the latest improved strains are distributed to farmers. During the past three years our latest strain, No. 87-8, has led both in yield and money value in variety tests in the Coastal Plain section of the State. This strain of Mexican cotton is grown extensively in Nash, Edgecombe, Halifax and surrounding counties.

Peanut Improvement Work: This project was begun in 1929. Spacing experiments and selection work has been carried on since that time. Results of spacing experiments show that best yields and quality are secured from the Virginia Bunch when the hills are spaced 8 inches apart with 2 plants to the hill, and from the Virginia Runner when the hills are 12 inches apart with 2 plants to the hill. Line breeding with the Virginia Bunch has shown wide differences in total yields, percentages of Jumbo and Fancy Handpicks and shelling percentages. Seed of some of the new strains will be available for distribution soon.

Corn Selection: The Latham Double variety of corn is used exclusively at this Station. Each year field selections are made to improve the yield and quality.

Boll-Weevil Control: This project is at present limited to controlling boll-weevil on the Station's cotton and assisting farmers, County Agents, and Vocational Agricultural Teachers in this control work.

HORTICULTURE

Coöperating with N. C. Experiment Station

Pecan Varieties: The pecan trees in this test of 25 varieties are twenty-nine years old. The results show that the Schley, Stuart, Alley and Money-maker varieties succeed best in this section.

Sweet Potato Storage: This work has clearly demonstrated the value of the Government type of a sweet potato storage house, also the value of storing potatoes in crates versus bins. It has paid to buy the crates in every instance.

LIVESTOCK

Coöperating with N. C. Experiment Station

Sheep: This project deals primarily with the raising of lambs for early market and to determine the best methods for handling the small flock in the utilization of pastures and cover crops.

Hogs: The swine herd consists of three Duroc Jersey sows and a boar. Records are kept on the cost of carrying over brood stock. The pigs are used in the utilization project outlined under agronomy.

IMPROVEMENTS

During the fall and winter of 1934, certain improvements were added and many needed repairs were made to buildings. All of this was made possible by the special improvement appropriation of \$1,275.00 from the Department of Agriculture and C W A labor. A new water works system was installed, including a deep well, pump and engine. This was badly needed and the new system now gives sufficient water for our needs. All buildings with the exception of the horse barn were repaired and painted. New roofs were added to the Superintendent's house, implement shed and hog barn. The drainage ditches were cleaned out and several new ones were dug in the bottom lands at the back of the Station.

FIELD DAYS

The Annual Field Day held August 9, 1934, was successful in every way. The attendance was fine. The exhibits put on by the different divisions of the Experiment Station were better than ever before.

On Friday, August 10, 1934, the Negro Farmers' Field Day was held. Fourteen counties of the Northeastern section were represented.

Our programs are arranged to be instructive, as well as entertaining and the farmers and farm women look forward each year to this meeting.

GENERAL CROPS AND GARDENS

After the experimental work has been provided for, all available land is planted to feed crops in order to produce feed for the work stock and for the livestock on experiments. In addition, every man living on the Station is assigned land for his garden. In fact our tenants are required to have good gardens.

PIEDMONT STATION—STATESVILLE, N. C.

J. W. HENDRICKS

Station Established in 1903

Area of Station, 207 acres

Soil Type, Cecil Clay Loam

Elevation, 950 feet above sea level

Climatological data for 1933

Mean Annual Temperature, 61.4 degrees Fahrenheit

Annual Rainfall, 36.91 inches

Total Snowfall, 12.8 inches

The following will give the program of work and a brief progress report on the chief experiments underway.

LIVESTOCK

In Coöperation with N. C. Experiment Station

Drenching Lambs for Stomach Worms: The drenching of sheep with nicotine sulphate solution has proved to be a satisfactory practice in the control of stomach worms.

Wintering the Farm Flock of Sheep: The purpose of this project is to collect data on the cost of carrying a farm flock through the winter in a most economical and practical manner in keeping with general farm conditions, utilizing the stalks and stubble field gleanings, cover crops, etc.



PASTURING ABRUZZI RYE AT THE PIEDMONT STATION.



PREPARING SMALL GRAIN SEED-BED.

Pastures and Their Utilization by Sheep: To study pastures and forage crops with reference to reducing the needs for purchased feeds on piedmont farms.

Changes in Meat and Wool Characteristics: A study by weights, measurements and photographs of the improvements in the quality and quantity of meat and wool.

Breeding Stock: The Station furnishes ewes and pure-bred Hampshire rams as breeding stock when available.

The Family Sow: This project is to determine the cost of maintaining two pure-bred sows and one pure-bred boar and their offsprings under general farm conditions.

Cost of Raising Pigs: The results of this work is published in Experiment Station Bulletin No. 272. The Station also furnishes pure-bred Poland China breeding stock to farmers at a reasonable price.

AGRONOMY

In Coöperation with N. C. Experiment Station

Fertilizer Lime Rotation Experiment: The four-year rotation used in this experiment is as follows:

1st year—Cotton, rye (cover crop).

2nd year—Corn, wheat (in fall).

3rd year—Wheat, Red Clover.

4th year—Red Clover.

One-half of all plats are limed broadcast with one ton of ground limestone applied every fourth year. Where only one plant nutrient was applied, phosphoric acid gave the highest yield, with nitrogen second in importance. Potash is least required of the three main plant food elements. On the lime portions, applications of phosphoric acid alone gave greater yields of red clover hay than did applications of either nitrogen or potash alone.

Cotton Improvement: The Mexican Big Boll variety is grown exclusively at this Station. Pure lime selection work is carried on each year, and high yielding strains of uniform staple have been developed, which are well adapted to the conditions under which they are grown. Last spring this Station distributed to growers, 300 bushels of registered Mexican Big Boll Cotton seed, Strain 58-14.

Cotton Varieties: This project is to make a study of cotton varieties and strains with reference to new types that may be introduced from time to time.

Corn Breeding: To produce and maintain a high standard of Weekley's Improved, which has been leading in our variety work over a period of ten years. The Station has been distributing approximately 100 bushels of registered seed corn per year.

Corn Varieties: To determine the best varieties adapted to this locality. The following table shows the results of our work for the past eight years.

<i>Variety</i>	<i>Acre-Yield</i>
Weekley's	40.1
Jarvis Golden	38.8
Lathams	37.5
Southern Beauty	37.0

Small Grain Breeding: The production of varieties of small grain crops including wheat, oats, rye and barley which are superior in yield, adaptability and disease resistance is the object of this small grain work.

Registered and Certified Seed: The Station produces annually 800 bushels of registered and certified seeds. The demand for quality seed is increasing from year to year.

Wheat Variety Tests: Over a period of ten years we find Fulcaster, the leading bearded variety, with an average yield of 30.2 bushels. Leap's Prolific is leading our smooth head varieties with an average yield of 29.9 bushels.

Oat Varieties: The Lee variety has proved to be the best winter oat for fall seeding in the Piedmont area of the State. It is more resistant to winter injury than any known variety. Over a period of ten years it has been our highest yielder.

Barley Selections and Varieties: To develop more reliable types of barley with reference to yield, disease resistance and other favorable characteristics adapted to Piedmont North Carolina. We find the bearded varieties give us our best yields, while the objectionable feature is the harvesting and thrashing. The two outstanding varieties grown in this State are North Carolina Bearded, which is badly mixed, and Tennessee No. 6, a smooth barley which is comparatively pure. These varieties are both susceptible to smut diseases.

Head Selection (Barley): To develop more desirable types of barley, and to compare under uniform conditions those best adapted to Piedmont North Carolina as to yield and other desirable characteristics.

Rye Varieties: To determine the outstanding varieties adapted to this and other sections of North Carolina. Abruzzi gives us our best yield with but very little difference in Abruzzi and Balbo with reference to pastures, perhaps a slight advantage in favor of the latter. The Station produces approximately 200 bushels of registered Abruzzi seed for sale each year.

Rust Resistance Studies with Small Grains: To obtain strains or varieties of small grains which are suitable to North Carolina. Also to determine varieties which are more resistant to leaf and stem rust than the varieties which are now commonly grown.

Pasture Fertilizer Tests: To determine the best fertilizer for pastures in Piedmont North Carolina and the time of applying same. Our study reveals that nitrogen is our limiting factor.

FORESTRY

In Coöperation with N. C. Experiment Station

Forestry Variety Work: To determine the best variety of pines in this section. In this experiment we are studying the value of forestry in connection with soil building and the ability of pine trees to prevent erosion. This experiment is only seven years old, however, we are observing outstanding results.

HORTICULTURE

In Coöperation with N. C. Experiment Station

Peach Pruning Experiment: This test is in its tenth season, and the light pruning continues to give largest yields of fruit of good color and size at the least pruning cost.

Peach Fertilizer Tests: The result of this experiment indicates that nitrogen is the only element necessary to maintain growth and production of peach trees grown on this soil type.

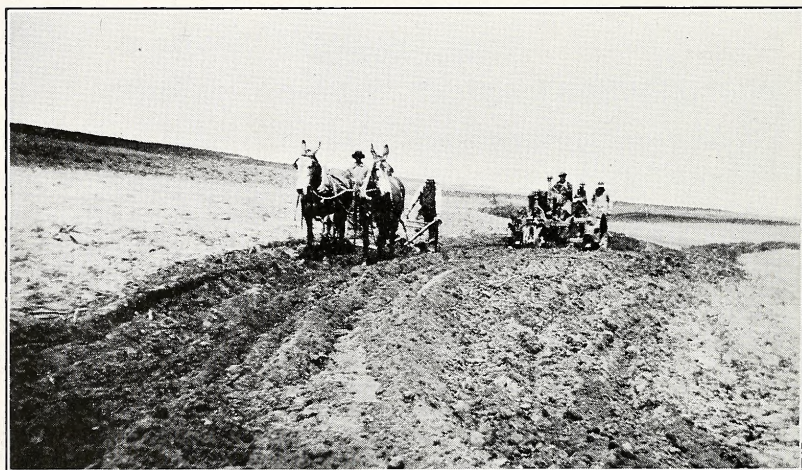
Peach Fertilization in Piedmont North Carolina: The project was started in the spring of 1932 to study the effect of fertilizer elements in combination with cover crops in growth and production of peach trees in clay soils.

Raspberry Fertilization: To determine the best fertilizer for the production of Latham raspberries in Piedmont North Carolina. This project was started in the spring of 1934.

Fruit Variety Studies: The purpose of this test is to determine fruit varieties best suited to Piedmont conditions. The



PEACHES READY FOR MARKET FOR THE EXPERIMENTAL ORCHARD.



REWORKING TERRACES AT PIEDMONT STATION.

test includes peaches, cherries, grapes, apples and the small fruits.

FORAGE CROPS

In Coöperation with the U. S. Department of Agriculture

Alfalfa: In a five-year test of alfalfa strains from different seed sources, Hungary and New Mexico plots gave the highest yields. Dakota, Grimm, and Kansas followed closely; Italian, Ontario Variegated, California, Argentine, Utah, South Africa and Disco were slightly lower. Turkestan yielded lower than any of the other strains.

Soybean Varieties: Herman and Haberlandt varieties rank as high yielders for both hay and seed over a period of five years. Laredo ranks third in hay yield and Virginia third in seed yield.

Annual Lespedeza for Soil Improvement: Corn following Korean and Common lespedeza yielded 26% more stover than adjacent plots which had never been in lespedeza. Grain yields were reduced on all plots by drought.

Korean, Kobe, Common and Sericea lespedezas responded to phosphorus treatment on a poor Cecil gravelly loam soil. Korean responded to lime more than either the Kobe or Common variety.

Acid Tolerant Legume Nursery: Notes were obtained on 75 species and strains of perennial leguminous plants grown in 15-foot rows in the Acid Tolerant Legume Nursery. Twenty annuals and 32 winter annuals were also studied in the nursery. Observations were obtained on dates of emergence, flowering and maturity and growth habits. Plants appearing to be worthy of more detailed study are Lespedeza sericea, F. P. I. 65903, Coronilla varia (crown vetch), Lotus corniculatus, and several strains of spring and hairy vetch.

Annual Lespedeza Tests: Korean lespedeza gave the highest hay yields on August 29th and the highest seed yields on October 28th. The highest yields of hay of Common and Tennessee 76 were cut on October 12th. The 1932 seed yields of Common and Tennessee 76 were low.

Yields on disked ground were higher than on unprepared ground. Plowing and preparing a firm seed bed was apparently no better than disking for seed bed preparation. There was a tendency toward higher yields on plots where the seed had been covered with a drill or harrow.

Lespedeza Sericea for Pasture: From the reaction of the animals during the 1932 and 1933 seasons on *Lespedeza Sericea* pasture it appears that there are certain stages of growth during which the plant is not palatable. More detailed experiments will have to be carried out before any definite conclusions can be drawn.

The Control of Dodder in Lespedeza: A number of methods of dodder control were studied with the conclusion that in so far as the methods studied were concerned effective control is expensive. Burning the infested areas with a blow torch proved to be the most economical of the effective methods tested. Application of a 3 percent solution by weight of sulphuric acid at the rate of 4 gallons per square yard was satisfactory in controlling dodder. The disadvantage of sulphuric acid is precaution must be taken to avoid contact or severe burns may result. Other methods of controlling same is to remove the dodder by cutting with a hand sickle. Pasture *lespedeza* has also proven to be an effective method.

PUBLIC RELATIONS

During the past two years this Station has furnished a camp for 4-H Club members. We have had two counties to camp with us with a total of approximately 200 members. These groups were supervised by their County and Home Agents.

The work of this Station is being appreciated more each year by the farmers throughout the Piedmont section of North Carolina. This is evidenced by the increasing number of visitors to the Station seeking information on service of some type. It is estimated that we have an average of 500 visitors each month. The Annual Field Day that is held during the latter part of August has been very successful in giving the farmers the benefit of our Station's program of work. This meeting is attended by approximately 3,000 people.

GENERAL

During the past few years it has been necessary to retrench in our program of work due to the reduced budget. The experiments have not been neglected, but funds would not allow for necessary repairs and upkeep of our buildings and fences. With an allotment of 3,500 hours of C W A labor supported by a special improvement appropriation from the Department of Agriculture, a program of repairs and painting was carried out

during the winter and spring of 1934. The Superintendent's house, office building and three tenant houses were repaired and painted. Twelve hundred rods of old fence was replaced with new woven wire and cedar posts. The swamp lands in the main pasture were cleared and drained by open ditches.

MOUNTAIN STATION—SWANNANOVA, N. C.

S. C. CLAPP

Station Established in 1908

Area of Station, 305 Acres Soil Types, Toxaway and Ashe Clay Loam
Elevation of Station, 2,250 feet above sea level

Climatological data for 1933

Mean Annual Temperature, 57.9 degrees Fahrenheit
Annual Rainfall, 37.68 inches

The following will give the program of work with a brief progress report on the principal experiments under way.

POULTRY

Coöperating with the N. C. Experiment Station

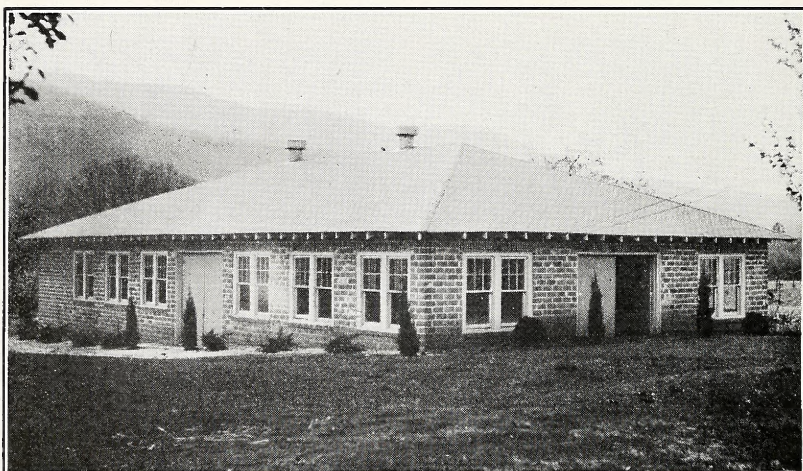
The Practicability of Summer Broiler Production in the Mountain Section of North Carolina: This project involves studies in incubation, brooding, developing and fattening of birds during the late spring and summer months. It is of practical importance in that the tourist traffic in the mountain section should furnish a ready market for broilers during the summer months. Feed consumption studies in the starting battery during the developing period, and in finishing, are being made. The rations used in fattening are those which can be produced locally.

Cost of Production Studies: These studies are being made with S. C. White Leghorns and Rhode Island Reds. These are representative of the possibilities of the section for the economical production of poultry products.

Breeding Studies: This project involves the development of standard S. C. White Leghorns and Rhode Islands Reds carrying standard type and egg production.



SUPERINTENDENT'S HOUSE AT MOUNTAIN STATION



AUDITORIUM AT THE MOUNTAIN STATION.

AGRONOMY

Coöperating with N. C. Experiment Station

Wheat Variety Studies: Of the eight varieties of wheat tested, the Fulcaster continues to give the largest yield. The average yield over a ten-year period is 27.1 bushels per acre.

Date of Seeding Wheat: In this test plantings are made every fifteen days, beginning September 15th and ending November 15th. The results show that the planting on October 1st gives the largest yields.

Corn Variety Test: The records so far indicate that Holcombe's Prolific, Southern Beauty, Bigg's Prolific and Jarvis' Golden Dent are best suited to this section.

Oat Varieties: The Fulghum variety continues to give the largest yield. The spring plantings have given better results than fall plantings, owing to the effect of winter killing.

Rye: In comparing the value of Common and Rosen rye for this region, the tests continue to show a small increase in yield in favor of the Rosen.

Flax: One acre of flax was planted in the spring of 1934. This project was handled in coöperation with the U. S. Department of Agriculture and the Textile Foundation Institute. The acre produced 2,416 pounds of excellent quality flax which was shipped to Clemson College, S. C., for further fiber studies.

Fertilizer Requirements of Corn, Wheat and Soybeans in Rotation: The plats of this field receiving the higher applications of phosphoric acid, with normal amounts of potash and nitrogen, have produced the largest yields.

Fertilizer and Lime Requirements of Irish Potatoes, Wheat and Soybeans in Rotation: This experiment was started in 1915, and was discontinued in the spring of 1934. Those plats which have received a complete fertilizer for each crop, with a supplemental application of limestone once in the rotation, have produced the largest yields of wheat and soybeans, but the yield of Irish potatoes was greatly reduced through the ravages of scab of the tubers when the limestone was added alone, or with complete fertilizer.

Sources of Phosphoric Acid for Corn, Wheat and Soybeans in Rotation: The data thus far obtained has shown that superphosphate is the most effective source of phosphoric acid for all crops used in the rotation.

Comparison of Rock Phosphate and Superphosphate for Corn and Crimson Clover in a One-Year Rotation: Results show that when these two phosphatic materials are used separately at rates supplying equal amounts of phosphoric acid per acre with potash from manure salts, the superphosphate gave a larger yield of corn than did the use of finely ground phosphate rock.

To Determine the Effect of Intercropping with Soybeans on the Yield and Growth of Corn: The yields of corn are reduced to some extent by intercropping with soybeans, both when planted in the same row with the corn, and when planted in rows between 6-foot corn rows. During dry seasons the corn yields are reduced to a greater extent, as compared with corn alone. However the value of the beans in the corn, which are harvested, used for pasture or soil improvement purposes will offset to a large extent the loss in the yield of the corn.

Continuous Corn and Crimson Clover: This has been the outstanding cropping test of our program. A ten-acre field has been planted annually to corn and crimson clover for the twenty-three-year period ending in 1934. The crimson clover is sown in the corn at the time of the last cultivation. The clover is plowed under around the first of the following May and the land planted back in corn. At the beginning of the test this land produced 18 bushels of corn per acre, and at the close of the twenty-three-year period the production was 46 bushels per acre.

HORTICULTURE

Coöperating with N. C. Experiment Station

Apple Varieties: Thirty-eight varieties of apples are studied to determine the quality, yields and storage qualities. The Wine-sap, Staymen, Rome Beauty and Delicious varieties seem to be the leaders for this section. The Joyce, a new summer variety, shows considerable promise.

Raspberries: The Latham has given best results of the eight varieties used in this test.

Grapes: Records on the 72 varieties of grapes, included in this experiment, show that the following are best suited to this section: Concord, Niagara, Green Mountain, Lutie, Herbert, Ontario and Delaware.

Cherries: The Montmorency and Early Richmond are the superior sour varieties, and the Napoleon and Schmidt are the most desirable sweet types.

Dewberries: The Lucretia is the leading variety for this section.

Strawberries: Of the 18 varieties tested the Premier and Warfield are the leading varieties in this mountain country.

Apple Pruning: This experiment was started in 1919, to determine the effect of the amount of annual pruning on tree performance and yield of fruit. The lightly pruned trees have given the highest total yields. The information available at this time indicates that different varieties may require a varying amount of pruning.

Apple Storage: The results show the importance of a properly constructed apple storage house in order to control temperatures and humidity.

The Vegetable Garden: The practice of maintaining a year around vegetable garden is being continued. Information is secured on varieties best suited to the section, cultural practices and insect control.

DAIRYING

Herd Development: This project is a breeding and management study of Jersey cattle for increasing the production of butter-fat by using sires with pedigrees indicating high production.

The herd average for 18 cows in 1930, was 341 pounds of butter-fat. In 1933, the herd average for 20 cows was 352.76 pounds of butter-fat and 6,684 pounds of milk.

Dairy Feeding Studies: The North Carolina 4-3-2-1 dairy grain ration, which resulted from this test, is still popular with the dairy farmers. The dairy feed mixture is now being sold by the leading milling companies in the State.

Pasture Management Studies 111: This test was started in 1930, and consists of five, three-acre areas. Four of the plats receive complete fertilizers in varied amounts, and the remaining plat receives no treatment. The grazing value of each plat is measured in terms of milk and butter-fat, using pure-bred Jersey cows. The results show that it pays well to fertilize pastures.

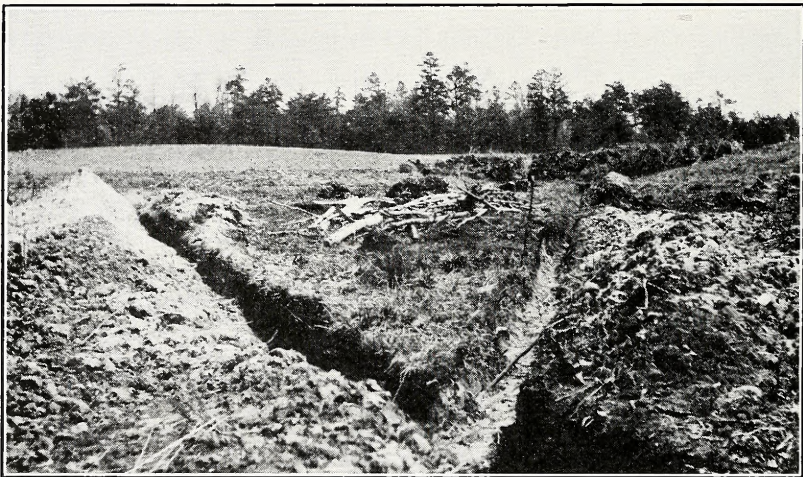
SWINE

The Family Sow: Information is secured on the cost of maintaining a small herd of Berkshire hogs. The Station also sells breeding stock to farmers of the section at a reasonable price.

IMPROVEMENTS

The concrete block auditorium which collapsed as the result of a severe wind storm was rebuilt August, 1933. This building is used for the Annual Field Day and for various community meetings.

With a special improvement appropriation from the Department of Agriculture and C W A labor, a program of repairs to buildings and painting was launched during the winter and spring of 1934. This improvement work has greatly added to the general appearance of the Station.



CLEARING LAND AND DRAINAGE AT MOUNTAIN STATION.

PUBLIC RELATIONS

The 4-H Club Camp at this Station continues to increase in popularity. During the past summer 600 club members attended the camp under the leadership of their county and home agents. Each group of boys and girls at the camp spend considerable time in studying the various experiments under way at the Station.

The farmers of Western North Carolina are becoming better acquainted each year with the work that is being conducted at this Station. This is evidenced by the large number of visitors during the year, and the daily inquiries which come through the mails. The Annual Field Day held on the third Thursday in August is well attended by farmers and others interested in the

agricultural development of this region. On July 4, 1934, the State Jersey Breeders Association held their meeting here.

The number of visitors seeking information on some phase of agriculture is increasing each year, and it is interesting to note that these visitors are not all confined to North Carolina, but come from other states, and in a few instances from foreign countries.

ACKNOWLEDGMENTS

In closing this report I wish to express my appreciation of your generous support of our Test Farm work, and to acknowledge the loyal and efficient service rendered by the members of this Division and of the Institutions coöperating in our program.

WAREHOUSE DIVISION

A. B. FAIRLEY

The Warehouse System has continued its steady growth and its benefits continue to reach more and more people each year.

The number of warehouses licensed during 1932-33 was 77 with a storage capacity of over 400,000 bales, the warehouses handling 394,000 bales of cotton. During the year 1933-34 the number of licensed warehouses increased to 82 with a storage capacity of over 430,000 bales. These warehouses have handled during the year over 440,000 bales of cotton. Considering the decrease in the amount of cotton raised in the State during the past few years the percentage of the crop handled by the warehouses is much greater than has been in the past. A good part of this was due to the fact that the Federal Government made loans to producers both for planting purposes and on the actual product after it was raised. To obtain the Government loans it was necessary that the cotton be stored in a reliable warehouse and receipts obtained of the best quality. The warehouses licensed under the State System fully met the requirements of the Government and furnished a receipt that was readily acceptable. As the warehouses are scattered throughout the cotton-producing counties they are easily accessible to the producers. The warehouses further aided the producers in every way possible to secure the loans; also aided in selling the cotton when it was so desired by the producer. The Warehouse System as a whole has coöperated in every way possible with the Federal Government in all its varied movements to benefit the farmer.

The warehouses were examined, as usual, four times each year by the Federal Government, and no serious infraction of the warehouse rules and regulations was found. One large fire occurred destroying over 3,400 bales. The depositors and owners of this cotton were paid by the insurance company on a basis that was entirely satisfactory to all. This office aided materially in securing a good price for the depositors.

The classing department continues to class a large amount of cotton each year for the depositors and producers, having classed over 40,000 bales each year. It has also supervised the classing of approximately 30,000 additional bales.

The loans for new warehouses and remodeling of old warehouses were made to the following:

Farmers Cotton Storage and Warehousing Co.	.....	Goldsboro
Wagram Bonded Warehouse	.....	Wagram
Vance Storage Company	.....	Henderson

The loans totaled \$19,600.00.

Most of the warehouses owing the State on account of loans made have kept up payments of interest and some of the principal, the Union County Warehouse Company at Monroe having paid the amount due in full. The warehouses that are slightly behind in the payment of interest should be able to fully meet the payments as soon as the cotton now in storage is removed from the warehouse and the storage due on same is paid.

The warehouses located at Norlina and Benson, which were foreclosed by the State, have been leased each year and a good rental was received from same. Below is a statement of the interest and principal received during the past two years; also a statement of the funds of the Warehouse System.

AMOUNT COLLECTED IN PAST TWO YEARS

Interest	.....	\$28,198.33
Principal	.....	21,409.58
Total	.....	\$49,607.91

LOANS TO WAREHOUSES

Vance Storage Company	.....	\$ 3,000.00
Farmers Cotton Storage and Warehousing Co.	.....	16,000.00
S. J. Womble, Wagram Bonded Warehouse	.....	600.00
Total	.....	\$19,600.00

	<i>Cash on Hand Principal Fund</i>	<i>Amt. outstanding loans on which State Holds 1st Mortgage</i>	<i>Invested in Bonds</i>	<i>Cash on Hand Supervision</i>
1933	\$59,813.33	\$282,699.50	\$312,000.00	\$15,363.94
1934	1,525.41	309,809.08	362,297.50	23,851.79
Purchase of Bonds	.....	.....	.....	\$50,397.50

TRANSFERS FROM SUPERVISION TO PRINCIPAL

1933	.....	\$20,000.00
1934	.....	4,000.00

DAIRY DIVISION

DR. A. H. KERR

The Dairy Division has inspected plants in 162 towns, doing 482 inspections. These inspections covered 1,267 milk tests and 1,240 cream tests, making a total of 2,507 Babcock tests for butter-fat in milk sold at plants in North Carolina.

In coöperation with the Weights and Measures Division, there have been 115 scales inspected in the milk plants of North Carolina and among these inspections five new sets of very desirable scales have been installed, and five additional specially arranged to make more adequate weighing facilities. Forty-two sets of weights for laboratory scales have been tested and approved and three sets of weights condemned and confiscated.

Throughout this period of two years the Chief of the Dairy Division has made twelve addresses at public meetings and ten radio talks. Much inquiry has been made with regard to food value of milk and dairy products and a great deal of information has been distributed by mail along this line.

The U. S. Department of Agriculture is carrying on a butter clean-up campaign and a cream grading program, the purpose of which is to increase the quality and thereby promote the industry to a better demand for high quality butter. This program has been aided in so far as possible and coöperation with the creamerymen and producers has been requested by both.

The Dairy Division, being responsible for the Dairy Products Exhibit at the State Fair, met with a suggested committee and arranged for an exhibit with the idea of promoting consumption of dairy products, which proved to be very acceptable to the people in that requests were made for 8,000 sheets of milk facts and related information. It is safe to say that 8,000 to 10,000 people were given information of an educational nature, and consulted with about the value of milk and dairy products in our daily diet. The Dairy Association decided to put up \$20.00 additional for two premiums, one a poster stressing "Why I should consume milk and dairy products," and one for an essay on the same subject, the premium being \$10.00 for each. The poster is on display in the Dairy Division office and a copy of the essay received considerable comment from those folks interested in dairy products.

Much care has been used in preparing a bulletin to conform to the Attorney General's opinion in enforcing the dairy law which made official the Babcock test for the determination of butter-fat for milk and cream. To put into effect the requirements of this law examinations have been held in thirty of the plants during which seventy-seven individuals were examined. These examinations were for license to operate the Babcock test according to rules and regulations established by the Department of Agriculture. These examinations have been held in the plants since it required demonstration by directly doing the test.

DIVISION OF WEIGHTS AND MEASURES

C. D. BAUCOM

The General Assembly of our legislature in 1933, felt that conditions demanded that the cost of government be greatly reduced and set about so to do, thus resulting in so drastic a cut in appropriation for the enforcement of the weights and measures laws that all field inspectors were laid off and overhead reduced to a minimum. I make this comment as a mental note in comparing this report with that of two years ago.

Recognizing the conditions under which the 1933 General Assembly had to act, yet realizing the importance of maintaining standards of weights and measures in the dealings of the people one with another, caused Guilford and Mecklenburg counties and the City of Asheville to set up in their budgets funds to pay for the services of full-time inspectors with the understanding that this was temporary and effective until such time as the State would be in position to carry out the mandates of the laws as regards to such inspectors.

Our inspections have been spread as evenly as economical to do so over the entire State which were as follows:

Inspections	19,757
Condemnations	3,728
Confiscations	2,905
Packages	2,151
Releases	705
Deliveries (ice and coal)	281
Tank wagons	24
Prosecutions	21

With the aid of the Dairy Division one hundred percent inspections of creameries and milk receiving stations were made, which disclosed that 82% of them had defective or inaccurate weighing or measuring equipment. This condition was, of course, corrected at once with the creameries and receiving stations coöperating beautifully. No prosecutions were necessary.

The Cotton Weigher Act of 1875 and Tobacco Weigher Act of 1895 (Consolidated Statutes No. 5086 and 5125) are being violated most flagrantly. It, therefore, is suggested that a new law be enacted repealing these and setting up a uniform Weighmasters' Act to cover cotton, tobacco, peanuts, coal and Public Weighers.

The demands on this office for certification of test and accuracy of weighing or measuring devices and the calibration of tanks are constantly increasing. We have endeavored to comply with all demands and requests as promptly as possible; we have also investigated such complaints as were warranted.

In conclusion is noted this observation: In one of the localities where a new inspector was put on, records disclosed that about 81% of all packages put up in advance of sale were short weight or illegal and that 80% of all gasoline pumps were short-measuring the public to the extent of about one cent per gallon. After the inspector had been on for a short while, this condition cleared up and records show less than 3% of scales, pumps and packages in error. It is believed that the conditions in this locality are no different from those of other places in the State and this is mentioned to show the vast importance of this inspection work to the masses of our people.

FINANCIAL STATEMENT

STATEMENT OF DISBURSEMENTS

JULY 1, 1932—JUNE 30, 1934

<i>Administration</i>	<i>1933-34</i>	<i>1932-33</i>
Board	\$ 826.44	\$ 1,076.10
Salary Commissioner	3,825.00	2,081.22*
Salaries staff	9,638.68	8,078.37
Supplies	745.86	711.44
Tags	7,214.90	2,742.54
Postage	460.00	700.00
Telephone and telegraph	209.02	206.38
Freight, express, drayage	61.39	99.41
Travel	740.22	513.38
Printing forms	225.31	150.32
Bulletins	1,534.25	2,349.60
Repairs	20.51	4.00
General	95.38	66.07
Equipment	59.19	22.46
Total	\$ 25,656.15	\$ 18,801.29
<i>Inspection</i>		
Salaries	\$ 5,283.67	\$ 5,219.88
Supplies	75.04	46.50
Postage	10.00	-----
Express	362.73	366.93
Travel	11,592.96	11,201.27
Printing	35.14	-----
Total	\$ 17,359.54	\$ 16,834.58
<i>Markets</i>		
Salary chief	\$ 2,250.00	\$ 2,671.89
Salaries staff	4,793.06	6,780.58
Salaries extra	155.00	86.66
Supplies	183.79	92.64
Postage	200.00	175.00
Telephone and telegraph	112.68	91.88
Express	1.07	.87
Travel	2,539.47	2,786.63
Printing	30.00	-----
Repairs	8.10	.75
Fees	499.65	824.59
Subscriptions	50.00	80.00
Equipment	72.55	-----
Total	\$ 10,895.37	\$ 13,591.49

*One-half Commissioner's salary and part of staff salaries (\$2,883) paid by Gasoline Division in 1932-33.

<i>Savings and Loan</i>	<i>1933-34</i>	<i>1932-33</i>
Salary superintendent	\$ 1,740.00	\$ 2,109.39
Travel	799.85	636.57
Forms	227.43	125.01
Total	\$ 2,767.28	\$ 2,870.97

Analytical

Salary chief	\$ 2,250.00	\$ 2,671.89
Salaries chemists	9,240.00	10,378.14
Salaries clerks	2,310.00	2,896.89
Salaries janitors	1,364.89	2,096.25
Supplies	615.11	736.22
Postage	200.00	175.00
Telephone and telegraph	60.00	60.00
Express	37.45	36.24
Printing	151.98	55.05
Repairs	25.45	34.25
Equipment	455.98	312.70
Total	\$ 16,710.86	\$ 19,452.63

Entomology

Salary chief	\$ 2,250.00	\$ 2,671.89
Salaries staff	5,130.00	5,962.53
Supplies	170.00	65.01
Postage	260.50	225.00
Telephone and telegraph	79.67	87.65
Express	8.70	2.78
Travel	2,340.25	2,506.80
Printing	399.68	305.69
Subscriptions	50.00	75.42
Total	\$ 10,688.80	\$ 11,902.77

Botany

Salary chief	\$ 2,250.00	\$ 2,671.89
Salaries staff	4,441.29	6,271.89
Supplies	115.58	136.20
Postage	125.00	150.00
Telephone and telegraph	61.22	60.73
Express	5.18	-----
Travel	11.50	13.60
Printing	153.90	13.89
Repairs	16.04	8.50
Equipment	44.19	67.50
Workmen's compensation	140.50	-----
Total	\$ 7,364.40	\$ 9,394.20

Pure Food

	1933-34	1932-33
Salaries	\$ 7,326.64	\$ 4,935.96
Supplies	432.86	374.06
Postage	136.00	85.00
Telephone and telegraph	75.73	68.87
Express	13.64	7.89
Travel	119.40	16.40
Printing	73.51	14.00
Repairs	20.00	34.60
Laundry	2.13	7.02
Equipment	150.00	183.84
Total	\$ 8,349.91	\$ 5,727.64

Crop Statistics

Salary chief	\$ 1,560.00	\$ 1,828.14
Salaries staff	6,120.00	7,109.39
Salaries census	2,856.21	1,893.14
Supplies	201.07	323.56
Postage	30.00	27.20
Telephone and telegraph	96.24	82.75
Travel	416.23	677.31
Printing	1,219.64	1,336.12
Repairs	15.83	19.47
Subscriptions	16.20	8.50
Equipment	655.00	-----
Total	\$ 13,186.42	\$ 13,305.58

Museum

Salary chief	\$ 2,250.00	\$ 2,671.89
Salaries staff	1,929.96	2,467.47
Salaries extra	6.00	-----
Supplies	136.97	145.54
Postage	20.00	25.00
Telephone and telegraph	60.30	61.35
Express	8.58	5.77
Travel	80.80	-----
Printing	7.00	-----
Subscriptions	10.00	23.00
Equipment	46.68	-----
Total	\$ 4,556.29	\$ 5,400.02

Serum

Supplies	\$ 351.74	\$ 341.64
Postage, express	783.01	720.40
General expense	1.97	28.85
Serum to be resold	6,878.10	7,954.82
Total	\$ 8,014.82	\$ 9,045.71

<i>Veterinary</i>	<i>1933-34</i>	<i>1932-33</i>
Salary chief	\$ 2,250.00	\$2,671.89
Salaries staff	7,794.98	9,407.88
Supplies	52.15	114.99
Telephone and telegraph	78.38	115.16
Express	34.04	14.30
Travel	4,259.67	4,631.57
Printing	9.32	37.59
Repairs	6.43	1.50
General	50.00	-----
Equipment	32.65	-----
Total	\$ 14,567.62	\$ 16,994.88
<i>Test Farms</i>		
Salary chief	\$ 2,250.00	\$ 2,671.89
Salaries staff	29,742.84	31,744.03
Supplies	15,837.62	14,856.30
Postage	83.00	100.00
Telephone and telegraph	98.04	74.23
Express	3.62	2.66
Travel	2,894.53	2,760.34
Printing	28.54	21.42
Insurance	384.05	975.27
Equipment	1,997.52	910.00
Auditorium	490.00	-----
Improvement	3,989.18	-----
Total	\$ 57,798.94	\$ 54,116.14
<i>Miscellaneous</i>		
Custodial	\$ 6,480.00	\$ 7,200.00
Farmers Convention	300.00	300.00
State Fair Exhibit	195.97	237.15
Total	\$ 6,975.97	\$ 7,737.15
<i>Dairy</i>		
Salary chief	\$ 2,250.00	\$ 2,671.89
Travel	1,339.92	1,395.94
Total	\$ 3,589.92	\$ 4,067.83
State Fair	\$ 2,026.73	\$ 7,689.75
Tobacco	950.64	2,097.64
Total	\$211,459.66	\$219,030.27
Paid to State College	\$ 26,350.00	\$ 30,140.00
Seed improvement work	4,550.00	4,650.00

WEIGHTS AND MEASURES

	1933-34	1932-33
Salary superintendent	\$ 1,500.00	\$ 1,687.50
Supplies		3.00
Postage	29.99	40.00
Telephone and telegraph	4.15	
Travel	725.81	634.68
Total	\$ 2,259.95	\$ 2,365.18

STATEMENT OF RECEIPTS

JULY 1, 1932—JUNE 30, 1934

	1933-34	1932-33
Fertilizer	\$174,528.98	\$176,297.41
Cotton-seed meal	24,197.66	22,931.07
Feed	46,363.68	46,442.16
Seed licenses	2,800.00	2,125.00
Condimental feed licenses	540.00	420.00
Hog cholera serum	8,592.19	10,586.23
Costs	728.52	303.04
Legumes	76.80	210.05
Bleached flour licenses	14,880.00	12,585.00
Bottling plant licenses	1,490.00	1,500.00
Ice cream plant licenses	1,795.00	1,525.00
Test Farm receipts	20,425.74	18,452.74
Bakery licenses	1,380.00	1,210.00
Chicken tests	3,222.42	3,958.70
Linseed oil	1,063.38	1,013.30
Markets	335.45	256.48
Permit tags entomology	1,643.65	1,807.81
Seed tags	2,251.82	1,446.00
Seed tests	6.50	9.00
Insecticides	548.75	414.88
Oleomargarine	900.00	1,000.00
Tobacco	574.65	686.46
Refunds	270.84	129.60
State Fair	2,077.73	
Total	\$310,693.76	\$305,309.93

Balance July 1, 1933.....\$102,544.41

Balance July 1, 1934.....170,878.51

UNIVERSITY OF N.C. AT CHAPEL HILL



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